



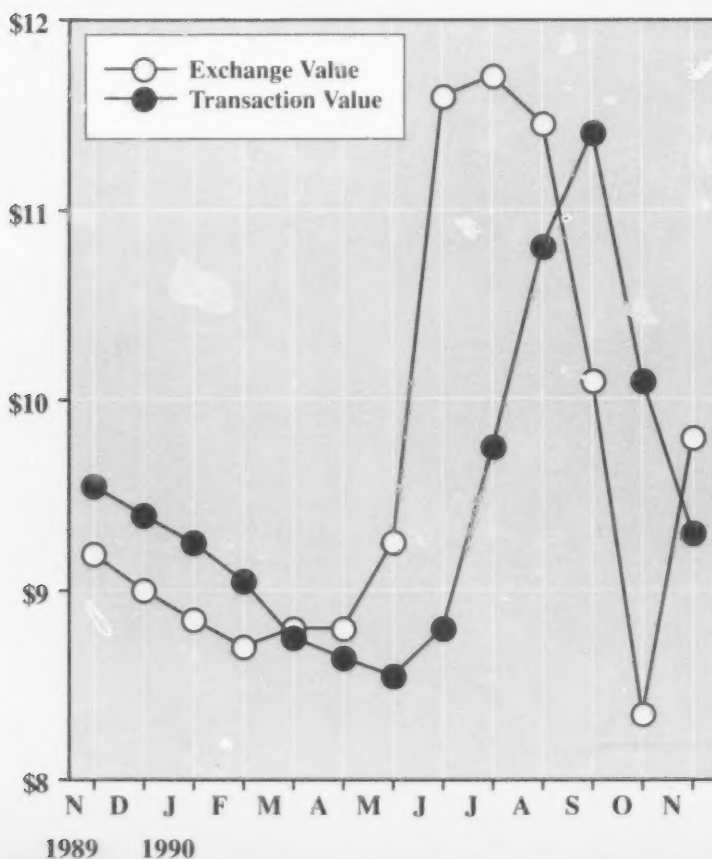
NUEXCO

Monthly Report

December 1990 Number 268

Preliminary 1990 Market Review 20

United States Energy Outlook: New Challenges, New Directions 25





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Other NUEXCO Publications:
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Nuclear Fuel Market Study;
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- **Preliminary 1990 Market Review**
Market prices were quite volatile during the year, sinking to record lows and achieving record increases. Increased utility reliance on the spot market, active producer buying to fill contracts, and increased activity by traders all contributed to this year's results.

Speech **25**

- **United States Energy Outlook:
New Challenges, New Directions**
J. Robert Wolcott, Chairman of NUEXCO's International Advisory Committee, spoke to members of the British Parliament on the outlook for the US electrical industry. Energy sources have to be examined as a group, and alternatives evaluated realistically.

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To Our Readers

We are pleased to announce that Susan L. Miller has joined NUEXCO. Susan was formerly Director of Budgets and Operations Analysis at Kennecott Corporation's Salt Lake City headquarters. She recently produced a development plan for Kennecott's investment in the Green Mountain Uranium Project in Wyoming—a joint venture with US Energy Corporation. Susan has also worked for British Petroleum and Standard Oil of Ohio, and has a broad range of experience including positions in technical sales, planning, budgeting, and project management. Susan earned a Bachelor of Arts degree from Penn State University and a MBA degree from Cornell University.



Susan will work as a commercial representative, initially in Denver, within NUEXCO's trading group. We welcome Susan to the organization.

MARKET REVIEW

Market Values Summary

NUEXCO Market Values	This Report November 30, 1990	Last Report October 31, 1990	12 Months Ago November 30, 1989
EXCHANGE VALUE¹	\$9.80/lb equivalent U₃O₈	\$8.35	\$9.20
UF₆ VALUE²	\$28.75/kg U as UF₆	\$24.75	\$27.75
LOAN RATE³	3.5% / annum	3.5%	3.5%
CONVERSION VALUE⁴	\$1.45/lb U as UF₆	\$1.45	\$1.75
SWU VALUE⁵ (0.3% tails assay)	\$51/SWU	\$51	\$57
TRANSACTION VALUE⁶	\$9.30/lb equivalent U₃O₈	\$10.10	\$9.55
Transactions	16	12	17
Months	3	3	3
Millions of Pounds	3.0	2.3	3.5

DEFINITIONS

¹ The **Exchange Value** is NUEXCO's judgment of the price at which transactions for significant quantities of natural uranium concentrates could be concluded as of the date indicated.

² The **UF₆ Value** is NUEXCO's judgment of the price at which spot and near-term transactions for significant quantities of natural uranium hexafluoride could be concluded as of the date indicated.

³ The **Loan Rate** is NUEXCO's judgment of the annual interest rate at which uranium loans could be concluded as of the date indicated.

⁴ The **Conversion Value** is NUEXCO's judgment of the price at which spot and near-term transactions for significant quantities of conversion services could be concluded in the secondary market as of the date indicated.

⁵ The **SWU Value** is NUEXCO's judgment of the price at which spot and near-term transactions for significant quantities of enrichment services could be concluded as of the date indicated.

⁶ The **Transaction Value** is a weighted average price of recent natural uranium sales transactions. The calculation is based on prices paid in:

- a) Transactions closed within the previous three month period for which delivery is scheduled within one year of the transaction date;
- b) At least ten transactions;
- c) Transactions involving a sum total of at least 2 million pounds equivalent U₃O₈.

DERIVATIONS AND COMMENTS

• All **Market Values** are expressed in terms of US\$.

• All **Market Values** are based on:

- Data from recently completed transactions.
 - Data from pending transactions.
 - Firm bids to buy or borrow, and firm offers to sell or lend.
- Prices purchasers or rates borrowers have expressed a willingness to pay, but for which NUEXCO is not aware of firm bids to buy or borrow and prices sellers or rates lenders have expressed a willingness to accept, but for which NUEXCO is not aware of firm offers to sell or lend.

• Prices associated with deliveries under old or renegotiated contracts or other than arm's-length transactions are not included in the determination of these **Market Values**.

• In the determination of prices, NUEXCO does not consider charges for transportation other than that customarily provided by suppliers.

• The prices of services or materials delivered under long-term contracts with primary suppliers are not considered in the determination of the listed values.

• For the **SWU Value**, NUEXCO converts SWU prices at varying tails and product assays to equivalent SWU prices at a tails assay of 0.30 weight percent U²³⁵ and a product assay of 3.0 weight-percent U²³⁵, assuming feed costs corresponding to the NUEXCO **Exchange Value** and **Conversion Value** determined as of the same date.

• In calculating the **Transaction Value**, NUEXCO does not account for the price of uranium delivered in connection with contracts which call for "market price" mechanisms. This exclusion applies particularly to contracts in which delivery prices are expressed as a function of future **Exchange Values** or any other indeterminate variable. Also excluded from the calculation are any other transactions in which the delivery price is defined in such a way that it can not currently be determined.

• The sample time for the **Transaction Value** is extended as necessary to satisfy the minima for the number of transactions and quantity of material. Other currencies are converted to US dollars using conversion rates in effect on or near the transaction date.

MARKET REVIEW

NOVEMBER MARKET REVIEW

(as of November 30, 1990)

OVERVIEW

Rebounding from last month's record percentage decreases, both the Exchange Value and the UF₆ Value recorded their second-largest percentage increases ever. The Exchange Value rose over 17 percent, to \$9.80 per pound U₃O₈. Similarly, the UF₆ Value rose 16 percent, to \$28.75 per kgU as UF₆. In early November, a number of discretionary buyers emerged when prices were in the mid-eight dollar range. As some sellers completed sales, others withdrew from the market temporarily; consequently, supplies tightened and prices quickly rose above nine dollars per pound. By month-end, concentrates sales were being made in the high nine-dollar range.

During November, nine near-term natural uranium sales involved a total of nearly two million pounds equivalent U₃O₈. Eight sales involved concentrates, the other involved natural UF₆. In addition, one long-term concentrates sale is reported. Total near-term uranium volume through November 1990 now exceeds 39 million pounds equivalent U₃O₈ (Table 1). A preliminary review of 1990 market developments is presented in an article beginning on page 20.

The Loan Rate at 3.5 percent per annum, the Conversion Value at \$1.45 per pound U as UF₆, and the SWU Value at \$51 per SWU all remain unchanged. One loan involving over 300 thousand pounds equivalent U₃O₈ is reported. No conversion sales are reported. In the enrichment market, one near-term SWU sale for a small quantity was concluded.

NATURAL URANIUM AND CONVERSION

The **Exchange Value** rose \$1.45, to **\$9.80** per pound U₃O₈. This 17.4% increase is the second-largest percentage increase in the history of the Exchange Value and is particularly dramatic, as it occurs immediately after October's record 17.3% decrease. Such market volatility is rare, and thus astonished many market participants. Prior to mid-1990, market prices had shown greater month-to-month stability since early 1984.

During late October and early November, sellers competed aggressively for limited sales opportunities. As a result, market price levels reached all-time low levels (after adjustment for inflation). The record low levels led to a new influx of discretionary buyers seeking material. Furthermore, several transactions removed some supplies as well, so near-term supplies tightened and higher prices developed.

Unlike the market in June, when some buyers had to purchase material and thus had to chase rising prices, November's discretionary buyers began to withdraw from the market as prices rose past nine dollars. Some buyers did not seem concerned about a price increase, and even elected not to purchase after evaluating the offers they received. In addition, some sellers entered the market and several others indicated their willingness to sell near \$10 per pound. These events limited the price increase.

Nine near-term natural uranium sales are reported for November. Eight of the sales involved concentrates; volume exceeded 1.8 million pounds equivalent U₃O₈. Early November sales were priced near the October 31 Exchange Value, but by month-end, sales were being concluded at substantially higher levels. Most of the near-term concentrates activity involved North American market participants. All of the sellers, and all but one buyer were North American. The majority of buyers were producers, and nearly all of the sellers were intermediaries.

* * *

Table 1
NEAR-TERM URANIUM SALES SUMMARY

	November 1990		Year-to-Date	
	No. of Sales	Volume ¹	No. of Sales	Volume ¹
Concentrates	8	2.0	63	23.0
Natural UF ₆	1		33	9.5
EUP	0	0.0	12	7.0
Total	9	2.0	108	39.5

¹ million pounds equivalent U₃O₈

MARKET REVIEW

Table 2
NEAR-TERM SUPPLY/DEMAND SUMMARY

	Active Supply ¹	Active Demand ¹
• Natural Uranium ² (thousand lbs equivalent U ₃ O ₈)	4,745	1,795
• Supply/Demand Ratio:	2.6	
• Loan (thousand lbs equivalent U ₃ O ₈)	9,305	0
• Conversion (thousand lbs U as UF ₆)	0	725
• SWU (thousand SWUs)	350	205

¹ Supply and demand tables in the current market data section of this Report provide details for each category.
² Includes concentrates and hexafluoride.

Following the Exchange Value, the **UF₆ Value** jumped to **\$28.75** per kgU as UF₆. This \$4.00 (16.2%) increase is the second-largest increase (in both absolute and percentage terms) since the UF₆ Value was first published on April 30, 1985, exceeded only by the June 30, 1990 increase of \$6.50 (25.5%). Market activity in the UF₆ market paralleled that of the concentrates market; low-priced offers early in the month enticed several discretionary buyers, which led quickly to higher prices by mid-month. Discretionary buyers in the market were receptive to either concentrates or UF₆, but most chose concentrates. Only one UF₆ sale, occurring near the end of the month, is reported. This transaction between two intermediaries took place near the November 30 UF₆ Value

* * *

The **Transaction Value** declined \$0.80, to **\$9.30** per pound U₃O₈ based on 16 transactions over 3 months involving 3.0 million pounds equivalent U₃O₈. The lower-priced sales from October and the higher-priced sales of September are about equally weighted above and below the average November sale price and effectively counterbalance one another. Thus, the Transaction Value, because it is a three-month weighted average, has smoothed out the volatility of the past few months.

Active uranium supply increased slightly to 4.7 million pounds equivalent U₃O₈. **Active uranium demand** also increased slightly to 1.8 million pounds equivalent U₃O₈. At the beginning of the month, a large imbalance existed with near-term supply greatly exceeding demand, but the influx of discretionary buyers quickly tightened supplies. As prices consequently rose, discretionary demand slipped and additional supply emerged, thus, by month-end the near-term **supply/demand ratio** was 2.6, only slightly lower than at the beginning of the month.

* * *

In the **long-term natural uranium market**, only one sale is reported this month. A US utility purchased over 600 thousand pounds equivalent U₃O₈ in the form of concentrates from a producer. The contract uses market-related pricing terms and provides for delivery during the period 1992-1994.

Competition for long-term uranium contracts remains intense. In October, one European utility had received 15 long-term concentrates offers. Late in November, a US utility seeking concentrates for delivery in 1994-1998 received offers from an even greater number of sellers. While sellers seek to conclude long-term contracts at higher prices, the current competitive environment favors buyers in their pursuit of lower prices and greater flexibility.

* * *

The **Loan Rate** remains at 3.5 percent per annum. Only one loan is reported, in which a producer borrowed over 300 thousand pounds equivalent U₃O₈ from a utility. Loan supply decreased just slightly, but still remains in excess of nine million pounds equivalent U₃O₈, while identifiable loan demand remains at zero (Table 2).

* * *

The **Conversion Value** is unchanged at **\$1.45** per pound U as UF₆. No conversion transactions are reported.

MARKET REVIEW

**ENRICHMENT SERVICES AND
ENRICHED URANIUM PRODUCT**

The **SWU Value** remained at: **\$51** per SWU. Only one near-term SWU sale is reported. A European utility

purchased a small quantity of SWU from an intermediary at an unknown price. In addition, four long-term SWU sales that occurred earlier in 1990 are reported; more than two million SWU will be delivered during the period 1994-2002. No enriched uranium product sales are reported. ■

**Table 3
ENRICHMENT PRICES
(November 30, 1990)**

Prices	This Month Report 268	Last Month Report 267	12 Months Ago Report 256
NUEXCO SWU Value (\$US per SWU)	51	51	57
US DOE SWU prices: (\$US per SWU)			
USEC	117.85 ¹	117.85 ¹	117.85 ¹
AFC	153.00 ³	153.00 ³	153.00 ³
Requirements	157.00 ³	157.00 ³	157.00 ³
Incentive Price (IP2) ⁴	100.60 ⁴	100.60 ⁴	90.00 ⁵
Calculated worth of enriched UF₆⁶: (\$US per KgU as UF ₆)			
2.0 w/o U ₂₃₅	206	190	212
2.5 w/o U ₂₃₅	284	263	294
3.0 w/o U ₂₃₅	364	339	378
3.5 w/o U ₂₃₅	446	416	465
4.0 w/o U ₂₃₅	528	494	552
4.5 w/o U ₂₃₅	612	573	640

¹ Effective 10/1/89 to 9/30/91.
² Effective 10/1/87 to 9/30/89.
³ Effective since 10/1/84.
⁴ IP2: Effective 10/1/90 to 9/30/91, for up to 30% of annual requirements.
⁵ Used Incentive Price IP1 – effective 10/1/86 to 9/30/90, for up to 30% of annual requirements.
⁶ Calculated using the NUEXCO Exchange Value, Conversion Value, SWU Value and 0.30 w/o tails assay.

MARKET REVIEW

RECENT TRANSACTIONS

Uranium Sales ¹						
NUEXCO Transaction Number	Delivery Period	Approximate Quantity (thousand pounds equivalent U ₃ O ₈)	Price Within Percentage Range ² of Current Exchange or UF ₆ Value	Buyer	Seller	Remarks
4975	1990	50-100	below 90	Producer	Intermediary	
4977	1992-1994	601-1,000	See Remarks	Utility	Producer	Price Related to Market
4988	1990	301-600	below 90	Intermediary	Producer	
4989	1990	101-300	90-97	Producer	Intermediary	
4990	1991	101-300	90-97	Utility	Intermediary	
4991	1990	Less Than 50	90-97	Producer	Intermediary	
4994	1990	101-300	90-97	Producer	Intermediary	
4996	1991	301-600	R	Utility	R	
4997	1991	101-300	98-102	Producer	Intermediary	
4998	1991	101-300	98-102	Intermediary	Intermediary	UF ₆
R means that NUEXCO either does not know, or that NUEXCO has restricted that information to protect client or source confidentiality.						
¹ Transactions listed are not limited to those in which NUEXCO was involved, but also include others of which NUEXCO is aware. NUEXCO may delay reporting some transactions in order to protect proprietary information.						
² The ranges <i>Below 90</i> , <i>90-97</i> , <i>98-102</i> , <i>103-110</i> , <i>Above 110</i> , represent percentages (rounded to whole numbers) of the appropriate current Exchange Value or UF ₆ Value. The endpoints of each range are included within that range.						



MARKET REVIEW

RECENT TRANSACTIONS

Natural Uranium Loans ¹						
NUEXCO Transaction Number	Delivery Period	Approximate Quantity (thousand pounds equivalent U ₃ O ₈)	Price Within Percentage Range ² of Current Loan Rate	Borrower	Lender	Remarks
4979	1990	301-600	98-102	Producer	Utility	
Conversion Sales ¹						
NUEXCO Transaction Number	Delivery Period	Approximate Quantity (thousand pounds of U equivalent)	Price Within Percentage Range ² of Current Conversion Value	Buyer	Seller	Remarks
No conversion sales are reported						
Enrichment Sales ¹						
NUEXCO Transaction Number	Delivery Period	Approximate Quantity ³ (thousand SWU)	Price Within Percentage Range ² of Current SWU Value ⁴	Buyer	Seller	Remarks
4982	1994-2002	101-300	R	Utility	Producer	Occurred Earlier in 1990
4983	1994-2002	601-1,001	R	Utility	Producer	Occurred Earlier in 1990
4984	1994-2002	301-600	R	Utility	Producer	Occurred Earlier in 1990
4985	1994-2002	1,001-3,000	R	Utility	Producer	Occurred Earlier in 1990
4999	1991	less than 50	R	Utility	Intermediary	
R means that NUEXCO either does not know, or that NUEXCO has restricted that information to protect client or source confidentiality. ¹ Transactions listed are not limited to those in which NUEXCO was involved, but also include others of which NUEXCO is aware. NUEXCO may delay reporting some transactions in order to protect proprietary information. ² The ranges <i>Below 90, 90-97, 98-102, 103-110, Above 110</i>, represent percentages (rounded to whole numbers) of the appropriate current Market Value. The endpoints of each range are included within that range. ³ If tails assay is unknown or unspecified, NUEXCO's calculation of SWU quantity assumes 0.30 % tails assay. ⁴ Prices are usually normalized to 0.30 % tails assay. When prices and SWU values are expressed as discounts from a reference price (e.g., X dollars less than DOE's USEC base price at time of delivery), the percentage price range is based on the discounted prices, not on the reference price.						

MARKET REVIEW

SUPPLY AND DEMAND

Uranium Supply				
NUEXCO Project Number	Quantity (Thousand Pounds equivalent U ₃ O ₈)		Delivery Period	Remarks
	Spot or Near-term ¹	Intermediate or Long-term ²		
Available for Sale:				
ACTIVE				
90-1078A*	1,045	1,045 per year	1991-1993	UF ₆
90-1227*	500	—	1990	
90-1231	500	500 per year	1990-1995	
90-1249	700	—	1990-1991	
90-7001*	2,000	1,000 per year	1991-1995	
Total	4,745			
INACTIVE				
	1,850			
Available for Loan:				
ACTIVE				
88-1182	4,400	—	U ₃ O ₈ /UF ₆	
90-1016	1,000	—	U ₃ O ₈	
90-1108	1,000	—	U ₃ O ₈	
90-1180	525	—	U ₃ O ₈	
90-1208	280	—	UF ₆	
90-1230	1,000	—	U ₃ O ₈	
90-1260	1,000	—	UF ₆	
90-1275*	100	—	U ₃ O ₈	
Total	9,305			
INACTIVE				
	1,000			
* New or revised since last month.				
¹ For delivery within one year, measured from the date of this Report. This category excludes material deliverable within one year under other than spot or near-term contracts.				
² For delivery beyond one year, measured from the date of this Report.				
Active Projects reclassified as Inactive since last month: none				
Active Projects removed since last month: 90-1212				

MARKET REVIEW

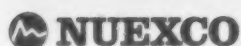
SUPPLY AND DEMAND

Uranium Demand				
NUEXCO Project Number	Quantity (Thousand Pounds equivalent U ₃ O ₈)		Delivery Period	Remarks
	Spot or Near-term ¹	Intermediate or Long-term ²		
Inquiries to Purchase:				
ACTIVE				
90-1100A	45	—	1991	UF ₆
90-1182	25	—	1991	
90-1235B*	250	—	1991	
90-1267*	100	—	1990-1991	
90-1271*	145	—	1990	UF ₆
90-1274*	500	—	1991	
90-1276*	300	—	1990-1991	
90-1277*	130	80 per year	1991-1994	
90-1284*	300	—	1991	
90-1170	—	290	1992-1996	
90-1205	—	260 per year	1992-2001	UF ₆
90-1226	—	1,045 per year	1992-1996	UF ₆
90-1240	—	260 per year	1994-1996	U ₃ O ₈ /UF ₆
90-1254A	—	250 per year	1993-1996	U ₃ O ₈ /UF ₆
90-1256	—	500 per year	1994-1998	U ₃ O ₈ /UF ₆
90-1281*	—	260 per year	1993-1996	
Total	1,795			
INACTIVE	2,625			
Inquiries to Borrow				
No inquiries to borrow are reported				
* New or revised since last month.				
¹ For delivery within one year, measured from the date of this Report. This category excludes material deliverable within one year under other than spot or near-term contracts.				
² For delivery beyond one year, measured from the date of this Report.				
Active Projects reclassified as Inactive since last month: 90-1229, 90-1241, 90-1262.				
Active Projects removed since last month: 90-1206, 90-1255, 90-1258.				

MARKET REVIEW

SUPPLY AND DEMAND

Conversion Supply And Demand			
NUEXCO Project Number	Quantity (Thousand Pounds U as UF ₆)		Remarks
	Within 3 Years ¹	Beyond 3 Years ¹	
Available for Sale: <i>No offers to sell are reported</i>			
Inquiries to Purchase:			
ACTIVE			
90-1259	210	—	1991
90-1264*	295	—	1991
90-1282*	220	—	1991
.....			
90-1254C	—	210	1993-1996
Total	725		
INACTIVE <i>None reported</i>			
* New or revised since last month. ¹ Measured from the date of this Report. Active Projects reclassified as Inactive since last month: <i>none</i> Active Projects removed since last month: <i>90-1261</i> .			



MARKET REVIEW

SUPPLY AND DEMAND

SWU Supply And Demand				
NUEXCO Project Number	Quantity (Thousand SWUs)		Delivery Period	Remarks
	Spot or Near-term ¹	Intermediate or Long-term ²		
Available for Sale:				
ACTIVE				
88-1006*	150	--	1991	
90-1078B*	200	435 per year	1991-1993	UF6e
90-7000	—	1,000	1991 on	
Total	350			
INACTIVE				
None reported				
Inquiries to Purchase:				
ACTIVE				
90-1100B	15	—	1991	UF6e
90-1224	40	100 per year	1991-1995	
90-1225	150	—	1991	
88-1061	—	500	1991-1995	
90-1076	—	350 per year	1992-1998	
90-1094	—	500	1992-2000	
90-1144	—	60 per year	1992-2001	
90-1181	—	600	1996-2003	UF6e
90-1196	—	60 per year	1995 on	
Total	205			
INACTIVE				
155				

* New or revised since last month.

¹ For delivery within one year, measured from the date of this Report. This category excludes SWU deliverable within one year under other than spot or near-term contracts.

² For delivery beyond one year, measured from the date of this Report.

Active Projects reclassified as Inactive since last month: none

Active Projects removed since last month: 90-1251.

MARKET REVIEW

MARKET VALUES EXPRESSED IN SELECTED CURRENCIES

Exchange Value¹

Country (currency)	per lb equivalent U ₃ O ₈ as Concentrates			per kg U as Concentrates		
	This Month (Nov. 30, 1990)	Last Month (Oct. 31, 1990)	12 Months Ago (Nov. 30, 1989)	This Month (Nov. 30, 1990)	Last Month (Oct. 31, 1990)	12 Months Ago (Nov. 30, 1989)
Australia (dollar)	12.70	10.65	11.79	33.02	27.69	30.66
Belgium (franc)	304.73	260.12	345.48	792.22	676.27	898.16
Canada (dollar)	11.41	9.74	10.73	29.66	25.33	27.89
EEC (ecu)	7.11	6.16	8.05	18.48	16.02	20.93
Finland (markka)	35.32	30.06	38.62	91.82	78.15	100.41
France (franc)	49.81	42.29	56.10	129.49	109.95	145.84
Germany (mark)	14.76	12.63	16.45	38.38	32.85	42.76
Italy (lira)	11,088	9,465	12,131	28,828	24,607	31,537
Japan (yen)	1,307	1,075	1,314	3,399	2,794	3,417
Netherlands (guilder)	16.66	14.24	18.55	43.30	37.03	48.22
So. Africa (comm. rand)	24.55	21.26	23.93	63.82	55.28	62.22
Spain (peseta)	935.92	791.54	1,060	2,433	2,058	2,755
Sweden (krona)	83.40	46.91	58.67	216.83	121.96	152.53
Switzerland (franc)	12.57	10.70	14.65	32.69	27.81	38.08
UK (pound)	5.06	4.27	5.88	13.15	11.11	15.28
US (dollar)	9.80	8.35	9.70	25.48	21.71	23.92

Transaction Value¹

Country (currency)	per lb equivalent U ₃ O ₈ as Concentrates			per kg U as Concentrates		
	This Month (Nov. 30, 1990)	Last Month (Oct. 31, 1990)	12 Months Ago (Nov. 30, 1989)	This Month (Nov. 30, 1990)	Last Month (Oct. 31, 1990)	12 Months Ago (Nov. 30, 1989)
Australia (dollar)	12.05	12.88	12.24	31.34	33.49	31.83
Belgium (franc)	289.18	314.64	358.62	751.80	818.00	932.33
Canada (dollar)	10.83	11.79	11.14	28.14	30.64	28.95
EEC (ecu)	6.74	7.45	8.36	17.53	19.38	21.72
Finland (markka)	33.52	36.36	40.09	87.14	94.53	104.23
France (franc)	47.27	51.16	58.23	122.89	133.00	151.39
Germany (mark)	14.01	15.28	17.07	36.42	39.73	44.38
Italy (lira)	10,523	11,449	12,592	27,357	29,764	32,737
Japan (yen)	1,241	1,300	1,364	3,225	3,379	3,547
Netherlands (guilder)	15.81	17.23	19.25	41.09	44.79	50.06
So. Africa (comm. rand)	23.30	25.72	24.84	60.57	66.86	64.59
Spain (peseta)	888.17	957.44	1,100	2,309	2,489	2,860
Sweden (krona)	79.15	56.74	60.90	205.77	147.52	158.33
Switzerland (franc)	11.93	12.94	15.20	31.02	33.64	39.53
UK (pound)	4.80	5.17	6.10	12.48	13.43	15.86
US (dollar)	9.30	10.10	9.55	24.18	26.26	24.83

¹ Calculated using currency exchange rates published in *The Wall Street Journal* on the last working day of the month.

MARKET REVIEW

MARKET VALUES EXPRESSED IN SELECTED CURRENCIES

Conversion Value¹

Country (currency)	per lb U as UF ₆			per kg U as UF ₆		
	This Month (Nov. 30, 1990)	Last Month (Oct. 31, 1990)	12 Months Ago (Nov. 30, 1989)	This Month (Nov. 30, 1990)	Last Month (Oct. 31, 1990)	12 Months Ago (Nov. 30, 1989)
Australia (dollar)	1.88	1.85	2.24	4.14	4.08	4.95
Belgium (franc)	45.09	45.17	65.72	99.40	99.59	144.88
Canada (dollar)	1.69	1.69	2.94	3.72	3.73	4.50
EEC (ecu)	1.05	1.07	1.53	2.32	2.36	3.38
Finland (markka)	5.23	5.22	7.35	11.52	11.51	16.20
France (franc)	7.37	7.34	10.67	16.25	16.19	23.52
Germany (mark)	2.18	2.19	3.13	4.82	4.84	6.90
Italy (lira)	1,641	1,646	2,307	3,617	3,624	5,087
Japan (yen)	193.44	186.62	250.00	426.45	411.42	551.16
Netherlands (guilder)	2.47	2.47	3.53	5.43	5.45	7.78
So. Africa (comm. rand)	2.52	3.69	4.55	8.01	8.14	10.04
Spain (peseta)	138.48	137.45	201.57	305.29	303.03	444.38
Sweden (krona)	12.34	8.15	11.16	27.21	17.96	24.60
Switzerland (franc)	1.86	1.86	2.79	4.10	4.10	6.14
UK (pound)	0.75	0.74	1.12	1.65	1.64	2.46
US (dollar)	1.45	1.45	1.75	3.20	3.20	3.86

SWU Value And UF₆ Value¹

Country (currency)	SWU Value at 0.30 %o Tails Assay			UF ₆ Value per kg U as UF ₆		
	This Month (Nov. 30, 1990)	Last Month (Oct. 31, 1990)	12 Months Ago (Nov. 30, 1989)	This Month (Nov. 30, 1990)	Last Month (Oct. 31, 1990)	12 Months Ago (Nov. 30, 1989)
Australia (dollar)	66.10	65.05	73.08	37.27	31.57	35.38
Belgium (franc)	1,586	1,589	2,140	893.97	771.03	1,036
Canada (dollar)	59.35	59.52	66.46	33.47	28.88	32.18
EEC (ecu)	36.99	37.64	49.87	20.85	18.27	24.14
Finland (markka)	183.80	183.60	239.29	103.61	89.10	115.86
France (franc)	259.21	258.32	347.56	146.12	125.36	168.29
Germany (mark)	76.83	77.17	101.89	43.31	37.45	49.33
Italy (lira)	57,705	57,810	75,158	32,530	28,055	36,392
Japan (yen)	6,804	6,564	8,143	3,835	3,185	3,943
Netherlands (guilder)	86.68	87.00	114.92	48.86	42.22	55.64
So. Africa (comm. rand)	127.76	129.87	148.28	72.02	63.03	71.80
Spain (peseta)	4,871	4,835	6,565	2,746	2,346	3,179
Sweden (krona)	434.04	286.52	363.50	244.68	139.04	176.00
Switzerland (franc)	65.43	65.33	90.75	36.89	31.71	43.94
UK (pound)	28.32	26.09	36.41	14.84	12.66	17.63
US (dollar)	51.00	51.00	57.00	28.75	24.75	27.60

¹ Calculated using currency exchange rates published in *The Wall Street Journal* on the last working day of the month.

RECENT DEVELOPMENTS

USA

NRC Investigates Sequoyah Fuels

Sequoyah Fuels Corporation's uranium processing plant has recently come under NRC scrutiny following discovery of two incidents of on-site soil contamination. During the most recent shutdown of its Gore, Oklahoma facility for routine annual maintenance, Sequoyah excavated two underground tanks as a part of the Environmental Protection Agency's new requirements. When the tanks were excavated in early August, Sequoyah personnel discovered the soil had been contaminated by liquid seeping from under the adjacent solvent extraction building. This contamination is believed to have occurred prior to 1988 when General Atomics acquired the Sequoyah facility. Some of the numerous Sequoyah samples registered uranium contamination of 1 to 8 grams per liter, a level 35,000 times the 225 micrograms per liter level that requires corrective action, but only 5.3 times the permissible concentration for the restricted area. Sequoyah reported the discovery on August 22, despite its belief that existing regulations did not require such a report. The NRC's region IV promptly sent an augmented inspection team (AIT) to investigate. When a second, similar condition was discovered and reported by Sequoyah on September 14, the NRC assigned inspectors to the plant seven days a week. The NRC also required Sequoyah to conduct extensive hydrologic studies and seepage-control upgrades, and submit the results by October 31.

The AIT's 32-page report, dated October 11 and released on October 25, criticized Sequoyah management on various grounds, essentially all of which relate to the

delays between Sequoyah's discoveries and its reports to the NRC. The report did commend Sequoyah's control of the contamination and protection of employees, once the responsible personnel were made aware of the results of the uranium contamination tests.

Subsequently, NRC Deputy Executive Director of Operations Hugh Thompson issued a "Demand For Information" on November 5. In this directive, the NRC required Sequoyah to (1) commit to an interim management oversight program, to be run by experienced personnel who have never been employed at the Sequoyah facility; and (2) submit a plan for corrective action—which has since been accepted by the NRC. To perform the management overview, Sequoyah hired the firm of Pickard, Lowe & Garrick. In the same directive, the NRC also required that Sequoyah submit by December 5 a plan for an independent, written appraisal of site and corporate activities. Sequoyah has requested proposals for an in-depth review to meet that requirement.

Sequoyah continues to operate the facility and day-to-day operations have not been impacted by the investigation. Sequoyah's NRC license was due to expire September 30, but Sequoyah had made a timely submittal of its license renewal application on August 29, thereby permitting the facility to continue operating during the NRC review of the 10-year renewal application. Quoting a Sequoyah spokesman, Sequoyah is "... committed to fulfilling the expectations of the NRC and to continue meeting (its) customers' requirements and contractual obligations." ■

RECENT DEVELOPMENTS

WASHINGTON FOCUS

November was a quiet month in Washington. Although Congress has recessed until 1991, the Senate filled vacancies in party leadership positions created by November's elections. The House is expected to proceed with its changes in early December. The Nuclear Energy Forum was held in Washington, DC on November 11-14 to discuss the status of the nuclear industry in the USA. The Forum, held in conjunction with the American Nuclear Society's annual meeting, assembled a large number of CEO's from US, European, and Far Eastern utilities and vendors. The meeting concluded with an announcement by **Philip Bayne**, President of NYPA and chairman of the Nuclear Power Oversight Committee (NPOC), of the results of a year-long NPOC study entitled a "Strategic Plan for Building New Nuclear Power Plants."

Senate Committee Developments

◇ Following the recent elections, the ratio of Democrats to Republicans on the Senate committees is not expected to change. The Senate Energy and Natural Resources Committee, which has jurisdiction over uranium enrichment issues, lost **Senator James McClure** (R-ID), the ranking Republican, when he chose to retire from the Senate. **Senator Pete Domenici** (R-NM) could have become the ranking minority member on the Committee, but declined because he would have had to give up his position as the ranking Republican on the more prestigious Budget Committee. Domenici's decision allowed **Senator Malcolm Wallop** (R-WY) to become the ranking Republican on the Energy Committee.

Now that **Senator Wendell Ford** (D-KY) has assumed a leadership position in the Senate, a uranium enrichment restructuring bill will be one of his top priorities. Progress on an enrichment bill may be slowed by changes at the staff level. The R & D subcommittee of the Energy and Natural Resources Committee lost two knowledgeable staffers with Cheryl Moss' departure and Ben Cooper's promotion to Committee Staff Director. Mr. Cooper may be unable to devote his attention to uranium enrichment, because his time will presumably be divided among all of the issues facing the committee. Mary Louise Wagner, who has been with the committee for several years but responsible for other issues, will likely be assigned uranium enrichment. An unknown factor is the new staff on the Republican side of the committee. With Sen. McClure's retirement and Sen. Wallop's rise to the ranking position, new working relationships must be developed, and the committee may not be able to function in the collegial fashion that has prevailed in the past.

Nuclear Energy Forum

◇ Government and industry representatives gathered for the Nuclear Energy Forum in Washington DC to discuss the status of the US nuclear industry. Representatives from the administration and Congress addressed the Forum on their activities in support of nuclear power. DOE Assistant Secretary for Nuclear Energy **Bill Young** reported on the National Energy Strategy. **Michael Deland**, head of the Council on Environmental Quality (CEQ), said he recently wrote to the NRC demanding the preparation of a full Environmental Impact Statement (EIS) before Shoreham is decommissioned. **Robert White** of the Department of Commerce spoke on the need to develop industry standards. He called on US industry to develop a strategy for influencing world standards organizations, and to concentrate on testing, certification, and verification procedures, so that US companies are not disadvantaged in world trade. Senator McClure spoke of the need for positive leadership, rational decision making and an emphasis on risk assessment in order to assist in the creation of a

RECENT DEVELOPMENTS

legislative process that will allow nuclear energy to be a viable alternative in the US energy mix. **NRC Chairman Kenneth Carr** spoke about nuclear power plant license renewal and the DC District Court's ruling on 10 CFR Part 52 (plant licensing). Although the NRC is disappointed by the ruling, which rejected the NRC's decision to limit the second hearing's role in the licensing process, the court did affirm the NRC's role in determining the process. The NRC has not yet decided whether to appeal the ruling.

Mr. John Yasinsky of Westinghouse talked about the industry's commitment to nuclear power. He noted that nuclear power reduces world oil consumption by 6 million barrels per day. Mr. Yasinsky said if a new nuclear power plant is to be ordered, the ownership structure of the new plant will likely be similar to an IPP. The next order probably will not be placed by a single utility, but by a consortium of utilities, vendors, A/E's, and financial institutions, with the backing of a state regulatory agency. **Loring Mills** of EEL said it is unlikely that there will be only one new plant order, because it would serve as a magnet for all anti-nuclear attacks, rather, a group of utilities will announce a series of plants throughout the country. **Anthony Leness** of Merrill Lynch gave a candid assessment of utilities' prospects for attracting the financing necessary for a new nuclear plant order. He noted that investors are not yet aware of the need for new plants, or the industry's desire to build a new nuclear plant. The industry must convince investors that significant changes have been made to the process so that design changes, regulatory delays, or anti-nuclear intervention will not cause the investors financial damage.

Another session focused on the recently-passed Clean Air Law and on global warming, and briefly noted nuclear power's contribution to lowering NOx and SOx emissions. One speaker pointed out that anomalies in timing and the trading of emissions credits permitted by the recently-enacted Clean Air Bill actually favor plants which have some emissions over nuclear plants, which have no emissions. In the short term, this development could put nuclear power at a disadvantage as a market is created for trading these credits. In the long term, it is beneficial for a utility to add nuclear capacity to meet the new tougher standards because emissions must be drastically reduced. **J. Michael Davis** of DOE's Conservation and Renewables Office spoke about the need for more energy efficiency. In developing the National Energy Strategy, DOE considered energy use by sectors. In order to achieve the goal of higher efficiency, it is important to increase the use of electricity across all sectors, but especially important to replace fossil fuel use in the industrial and transportation sectors. Within the commercial sector, DOE has researched electrical demand and how to reduce it. For example, in DOE's headquarters, 40 percent of electrical demand is plug load and is necessary 24 hours a day. (Plug load describes all of the office equipment plugged into the system, whether in use or not, such as computers.) He stated the US cannot assume that increased energy efficiency will consequently lower demand; in fact, demand for electricity could actually increase as its percentage of the total increases.

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Next Nuclear Power Plant Order

◇ In the final speech of the Forum, Phil Bayne, President and COO of New York Power Authority (NYPA), announced NPOC's Strategic Plan for Building a New Nuclear Plant. The industry hopes to establish a framework so that a new order can be placed by 1995 and construction completed by 2000. This plan will serve as a blueprint to create the environment necessary to allow a utility to order a new nuclear plant. Its four primary goals are:

1. Maintain excellent operating records at existing plants.
 - Current plants must maintain their record of safe operation.
 - Make progress on siting HLW repository, an MRS, and LLW sites.
 - Ensure a stable supply of fuel and uranium enrichment (support restructuring legislation).
2. Ensure a stable, predictable regulatory process for licensing.
 - Ask for legislation to streamline licensing.
 - Eliminate dual regulation.
 - One specific goal is NRC approval of GE's ABW reactor design and ABB-CE's System 80+ design by 1992, and Westinghouse's AP600 and GE's simplified BWR designs by 1995.
3. Standardization
 - Finish NRC-certified design of advanced reactors.
 - Coordinate siting with design.
4. Institutional steps
 - Broaden public acceptance at national and local level.
 - Create financing mechanisms.
 - Support state regulatory reform.
 - Enhance government support for new nuclear plants.

The entire project emphasizes communication, so the plan was released to the public to begin a dialogue.

INDUSTRY BRIEFS

Uranium Mine Closures

On November 8, Umetco Minerals Corporation announced the temporary cessation of mining activities at the La Sal, Sunday, and Dove Creek sites in Colorado and Utah. The White Mesa mill at Blanding Utah was put on standby in October. Late in November, Energy Fuels Corporation announced the temporary shutdown of its Kanab North mine in northern Arizona. The presidents of both Umetco and Energy Fuels cited low-priced imports and continued surplus supplies in the market as the reasons for their mines' temporary closures.

As of September 30, Freegold suspended uranium production at its Joint Metallurgical Scheme project in South Africa, citing rising costs and falling uranium grades as the deciding factors. The government of the Yugoslavian republic of Slovenia has halted production at the Zirovski vrh uranium mine and mill, pending an economic feasibility report that should be released near the end of 1990. After the Slovenian parliament reviews the report, the mine, which had been producing uranium for domestic use, may be permanently closed.

All Ontario New Reactor Plans Halted

Ontario Canada's recently-elected New Democratic Party (NDP) has fulfilled one of its anti-nuclear campaign promises by placing a moratorium on more nuclear plants in the province, and ordering Ontario Hydro to cancel recently-initiated advance engineering work on its 10-plant nuclear plan. New Ontario Premier Bob Rae stated "The moratorium means ... that (Ontario) Hydro's efforts and energies should be directed to conservation and to greater energy efficiency. As far as we (NDP) are concerned, it is a change of course for Ontario Hydro, and I think it is a significant change." The Party's freeze on nuclear planning does not affect Ontario Hydro's planning and construction at its Darlington station, nor the hearings on its 25-year demand/supply plan.

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B&W and GA Form MHTGR Fuel Joint Venture

Babcock & Wilcox (B&W) and General Atomics (GA) have formed a joint-venture company, named TRISO, to produce fuel and perform related services for modular high-temperature, gas-cooled reactors (MHTGR), such as in the DOE's new production reactor (NPR) program. TRISO, a 50/50 partnership, will be located in Lynchburg, Virginia.

Namibia Seeks Uranium Sales in Japan

In late October, the Namibian Trade Minister visited the Secretary General of the Japanese Energy Bureau and several Japanese utilities, to promote the sale of Namibian uranium. Now that Namibia is independent from South Africa, and therefore no longer subject to international sanctions, there should be no bar to a resumption of Namibian supply to Japan. Although Japanese utilities have long-term supply contracts that run into the mid-1990s, the Japanese Energy Bureau has stated that the country's expanding nuclear programs would offer new supply opportunities, and recommended that existing purchasing programs be re-evaluated. Namibia's Trade Minister will be opening an office in Tokyo to pursue these sales opportunities.

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Minatco Purchases Remainder Of Wolly Project

Minatco Ltd. now owns a 100% interest in the Wolly Project in northern Saskatchewan. Minatco increased its 33% share by purchasing the interests held by the uranium exploration project's former joint-venture partners, Canadian Occidental Petroleum Ltd. and Canadian Nickel Company Ltd. Minatco, an affiliate of the French firm Total Compagnie Française des Pétroles, will continue its exploration efforts this winter.

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**CGE Agrees To Relinquish
Control of Framatome**

CGE (Compagnie Générale d'Electricité; a French energy conglomerate) has agreed to sell 8% of its 52% interest in Framatome S.A. (the French nuclear engineering and construction company) to State-controlled companies for the sum of approximately FF650 million (US\$130 million). CGE will no longer hold the majority interest in Framatome, a position that CGE gained early in 1990 by buying an additional 10% interest from the French firm Dumez. Ever since CGE acquired the majority position in Framatome, both Framatome and the French government have used numerous legal challenges in attempts to force CGE to relinquish its majority position in Framatome. Both the State and Framatome wanted a State-controlled company to have the majority interest in Framatome, rather than a privately-owned French company, a goal which is now assured.

Under the new shareholding structure, a joint-holding company, controlled by the State's Commissariat à l'Énergie Atomique (CEA) and Electricité de France (EdF), will hold 46 percent of the Framatome shares, while Credit Lyonnais (a large state-owned bank) will hold five percent, and Framatome's employee association will hold five percent (up from three percent).

**Oregon Voters Keep Trojan
Nuclear Plant Open**

On November 6, nearly 60% of Oregon's voters rejected a measure that sought to close Portland General Electric's (PGE) Trojan nuclear power plant. The second such measure in four years sought to close the plant within a month after the vote. The 1,095 MWe (net) PWR would have been closed until the federal government opened a spent fuel repository. The key issue in the vote became economics, because PGE estimated the replacement cost of the Trojan generation capacity could reach \$3 billion over 20 years.

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**Soviets Invited To
Foratom Meeting,
Hungarians Form Society**

Representatives from the Soviet nuclear community were invited to Foratom's November 26 meeting in Prague, following their request to observe the meeting. Foratom also invited members of the recently-formed Hungarian Nuclear Society, which has elected Zoltan Szatmary (director of the Central Research Institute for Physics) as its first president. Hungarian officials decided not to create both a nuclear society and a nuclear forum, preferring to focus all their energies in a single group. Without a forum, Hungary will not seek membership in Foratom, a non-governmental association of 14 European national nuclear forums.

**Court Overrules NRC In
Licensing and Training Issues**

In a blow to the nuclear industry's one-step licensing process, the US Court of Appeals for the District of Columbia Circuit overruled key aspects of NRC licensing regulations. Although the court upheld many parts of the new NRC licensing regulations, it ruled that the NRC did not comply with the Atomic Energy Act when the NRC unfairly limited the public's right to petition for a formal adjudicatory hearing after a nuclear power plant's construction is complete, but before the plant's operating license is issued.

The US Supreme Court let stand a lower court's ruling that under the Waste Policy Act of 1982, the NRC must issue its own training regulations, and that it cannot simply endorse the training standards of the Institute of Nuclear Power Operations (INPO; an industry organization for self-improvement). The court's decision did not imply that the currently-used INPO programs were ineffective or inadequate.

RECENT DEVELOPMENTS**Glencar Exploration in
Joint Venture
with Hungarian Mine**

Glencar Exploration, plc. of Ireland has entered into a joint-venture agreement with Hungary's Mecsek Ore Mining Company (MEV) to redevelop and manage the Pecs uranium mine near the Yugoslavian border. For the remainder of 1990, Glencar will provide management and technical services. Starting in 1991, Glencar will be a major joint-venture partner with MEV, and will manage the mine operations, replacing MEV as the operator. The Pecs mine is well-equipped, and has a mill and ore-leaching plant serving the three mines that are open—two mines are already worked out. Annual production is approximately 500 MTU in concentrates, most of which is used to supply domestic reactors.

**Soviet Union and Argentina
To Cooperate in
Breeder Program**

Argentina and the Soviet Union signed a nuclear cooperation agreement in Moscow on October 25. With the influx of Soviet expertise, a 2010 target date has been set for bringing a joint Argentine and Brazilian breeder reactor on line. Argentina will supply the plutonium fuel by reprocessing the spent fuel from its Atucha-1 reactor at Argentina's Ezeiza reprocessing plant, while Brazil will provide the sodium moderator. All Soviet/Argentine transfers will be covered by IAEA safeguards.

**German Loans
Revive Atucha-2**

Argentina's government has obtained US\$133 million in loans from a consortium of German banks, and has indicated that work will resume on the Atucha-2 nuclear station (692 MWe net) in 1991. The loans, which are contingent on Argentina supplying matching funds, are guaranteed by the German government. The loans were first offered in July 1988, but until now, Argentina's government had been unable to provide the required matching funds. The government had been considering closing or selling the plant if financing could not be obtained (Monthly Report #264, August 1990, p. 21).

ANALYSIS AND COMMENTARY

PRELIMINARY 1990 MARKET REVIEW

OVERVIEW

The uranium market began 1990 with prices at record low levels, large supplies, and relatively modest demand. Though market prices were extremely volatile during the year—sinking to new record lows and achieving record increases, the market situation is now almost exactly the same as at the end of 1989. The underlying near-term oversupply of natural uranium remains unchanged. Natural uranium concentrates are selling between nine and ten dollars per pound U_3O_8 and natural UF_6 is selling between 28 and 29 dollars per kgU. Discretionary demand emerges near eight dollars per pound U_3O_8 , but tends to subside above ten dollars per pound. Supply remains abundant for both near- and intermediate-term sale. As a result of the emergence of Eastern European countries as uranium suppliers, the growing role of the Soviet Union and China, and the independence of Namibia, even more material is readily available than at the end of 1989. Until the oversupply situation is relieved on a macroeconomic level, significant and lasting price increases will not be possible.

In 1990, spot market volume has already set yet another record, continuing the trend toward even greater participation in the spot market. Although firm demand is only moderate, low prices are drawing out many discretionary buyers. Through November, over 39 million pounds equivalent U_3O_8 have changed hands in more than 100 near-term sales (**Figure 1**). The previous record volume was 1989's 32.3 million pounds in 107 sales, involving concentrates, natural UF_6 , and enriched uranium product (EUP). Increased utility reliance on the spot market, active producer buying to fill contracts, and increased activity by traders all contributed to this year's record results.

The conversion market has been stable. Despite some downward pressure early in the year from a glut of UF_6 relative to concentrates, the conversion value has remained at \$1.45 per pound U as UF_6 throughout most of the year. As of year-end, supplies of concentrates and UF_6 are roughly in balance.

The Loan Rate has remained unchanged at 3.5 percent per annum since November 1987. Loans have become a much more important part of the overall uranium market as utilities, producers, and other market participants seek to utilize excess inventories. Active loan supply has been growing all year, reaching nearly ten million

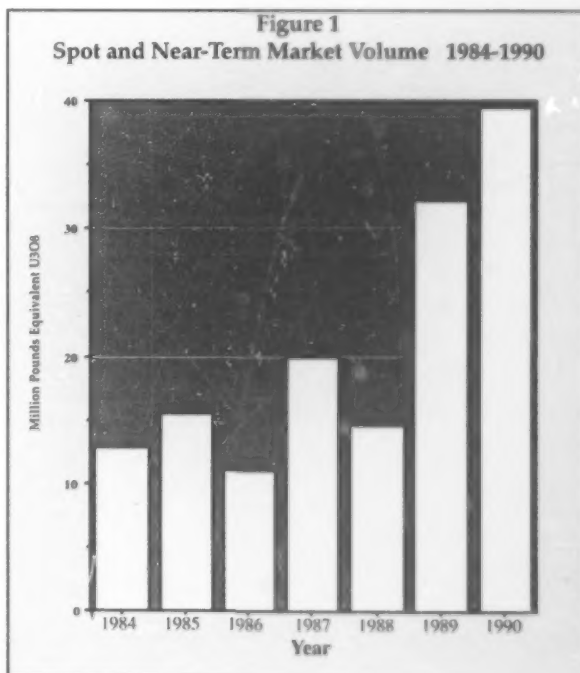
pounds equivalent U_3O_8 in October. Additionally, demand remains thin, so there is no upward pressure on the Loan Rate.

Over the course of 1990, secondary enrichment market prices have been stable as well. SWU market activity has varied from months with no sales and virtually no bids or offers, to months in which millions of SWU changed hands. Yet through it all, the spot price for SWU remained around \$50 per SWU; some sales were higher, some lower, but the abundance of SWU contained in enriched uranium within several national stockpiles kept suppliers under competitive pressures all year.

NATURAL URANIUM

Near Term Market Activity

The Exchange Value was \$9.00 per pound U_3O_8 as of December 31, 1989; it was \$9.80 per pound as of November 30, 1990. In the interim, the Exchange Value reached its all-time low (after adjustment for inflation) of



ANALYSIS AND COMMENTARY

\$8.35 per pound U_3O_8 on October 31, as buyers postponed purchases due to their lack of concern over a price rise and sellers became even more anxious to move material. The Exchange Value also recorded its all-time record percentage increase, jumping 25.4% from \$9.25 to \$11.60 on June 30, as many sellers exited the market just before demand increased. The concentrates market displayed these volatile price movements for the following reasons:

- The emergence of China, the Soviet Union, and various Eastern European countries as suppliers or potential suppliers of uranium contributed to a strong market perception of excess uranium on or approaching the market. Other contributing factors included Namibian independence, which led to the removal of sanctions against Namibian material in March 1990; the after-effects of the US-Canada Free Trade Agreement, which effectively silenced proponents of US mining protectionism; and the entrance into the market of a few large inventories of natural and enriched uranium, such as the German stockpile material, the Queensland Mines inventory, and the Sacramento Municipal Utility District's inventory. Furthermore, most traditional producers in the US, Canada, and Australia seemed reluctant or unwilling to shut down high-cost facilities or forego market share until well into 1990.
- Buyers and sellers reacted differently to the general market perception of plentiful supplies. Many utilities deferred or eliminated plans to purchase on a discretionary basis. For sellers, chiefly traders and some producers, optimism over rising prices evaporated during 1990, and many believed that selling at a low price now was preferable to selling at an even lower price later in the year.
- The increasing role of traders in the spot market has made it possible for utilities to depend more heavily on spot market sources without reducing their security of supply. In a market with more participants, emerging supplies can be absorbed more quickly, and new demand brings out more potential sellers. As more spot buyers and sellers move in and out of the market, often simultaneously, wider price swings can result.

In the first half of 1990, the interaction of motivated sellers holding large inventories and price-sensitive discretionary buyers, resulted in a protracted period of low

prices. Prices rose sharply in March through July due to increased demand and sellers' gradual departure from the market. Once prices exceeded \$11 per pound, enough sellers re-entered the market to not only halt the price rise, but to cause another steep drop in prices, down to the \$8.35 per pound level. Essentially the same cycle appeared to be recurring near the end of the year.

The movement of the UF_6 Value paralleled that of the Exchange Value (Figure 2). The UF_6 Value began the year at \$26.50 per kgU, moved down to its record low (in current and constant dollars) of \$24.40 on March 31, increased a record 6.50 (25%), to \$32.00 on June 30, dropped a record 16% (\$4.75) on October 31, then rebounded to \$28.75 per kgU on November 30. The basic market characteristics of material oversupply and limited firm demand present in the U_3O_8 market were also present in the UF_6 market. Week-by-week movements into and out of the market by discretionary buyers and selective sellers have caused rapid fluctuations in market price levels.

Spot Market Volume

Through November 1990, over 39 million pounds equivalent U_3O_8 have changed hands in 108 uranium transactions (Table 1). This year's spot market volume represents a 22% increase over 1989. Of 1990's total, EUP accounts for seven million pounds equivalent U_3O_8 in 12 sales; 96 natural uranium sales total over 32 million pounds equivalent U_3O_8 . Concentrates sales account for two-thirds of the natural uranium transactions (63 sales involving nearly 23 million pounds) and 70% of the total volume. The 33 natural UF_6 sales account for the remaining one-third of the natural uranium volume and 30% of the volume (over 9 million pounds equivalent U_3O_8).

Table 1
1990 Spot and Near-term Market Volume¹

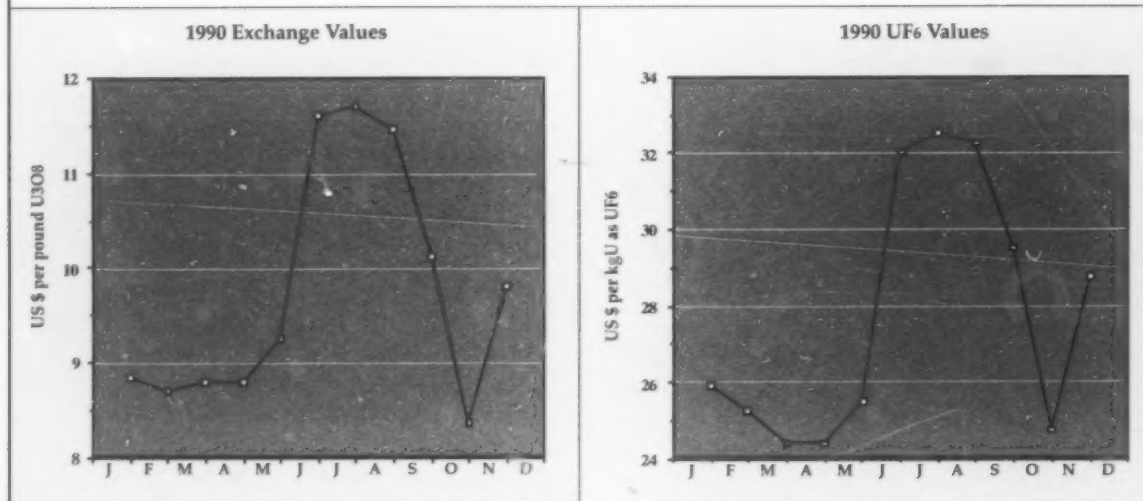
Uranium Form	No. of Sales	Volume ²
Concentrates	63	23.0
Natural UF_6	33	9.5
EUP	12	7.0
Total	108	39.5

¹ reported as of November 30, 1990

² million pounds equivalent U_3O_8

ANALYSIS AND COMMENTARY

Figure 2
1990 Exchange Values and UF₆ Values



Buyers

In a non-traditional role as buyers, producers purchased more than 8 million pounds equivalent U₃O₈ in 33 of the 96 natural uranium transactions. Australian, Canadian, and US producers all bought uranium during 1990. As usual, utilities were the most active buyers, accounting for nearly 12 million pounds in 39 spot market purchases. Intermediaries bought over 10 million pounds in 16 near-term purchases. However, this volume figure is abnormally weighted by one transaction in which a European intermediary purchased a nearly seven-million-pound inventory. That single transaction accounted for almost 70% of the material bought by intermediaries on the spot market.

Sellers

Intermediaries have been the most active sellers thus far in 1990, selling 19 million pounds in 67 transactions. Producers made fewer sales (18 transactions totalled over 11 million pounds), but at a higher average volume per sale. Producer sales averaged 640 thousand pounds, while intermediary sales averaged 285 thousand pounds. Utilities, convertors, fabricators, and all other market participants

accounted for less than one percent of the volume in 11 sales. Producers often were able to buy at low prices and choose between reselling the material if the spot price rose, or delivering the purchased material under long-term contracts (instead of producing material). As a result, they have sometimes played the dual role of producer-trader.

Long-term Market Activity

As in the spot market, long-term market volume has grown, exceeding last year's level of 34 million pounds. The 34 long-term natural uranium contracts concluded thus far in 1990 involve nearly 46 million pounds equivalent U₃O₈ (Table 2). Deliveries began as early as this year, and some extended to 2001. Individual quantities ranged from as low as 225 thousand pounds delivered over three years, to over three million pounds delivered over six years. Of the 34 sales, 27 involved concentrates, the other seven involved UF₆. US parties comprised the majority of the buyers (25 purchases); European utilities made up the balance (9 purchases). Producers (primarily North American) were the major sellers, concluding 24 of the 34 long-term contracts. Intermediaries concluded the balance of the intermediate and long-term sales.

ANALYSIS AND COMMENTARY

Lower spot market prices led to more competitive long-term pricing terms as well, particularly in the ten contracts that included base-escalated pricing mechanisms. Seventeen of the 34 sales involved market-related pricing terms, and the other seven used a series of fixed prices. Two sales use a combination of the different types of pricing terms.

As prices reached all-time lows, market-related contracts are being concluded with smaller discounts than in the past and often with "soft" floors. Soft floor prices allow a producer to walk away from delivery if the contract price is below that level. Although discounts in the past have been as large as five percent or more off the defined market price, recent transactions indicate most discounts fall in the 1-2% range. Sellers are beginning to give full recognition to the risk inherent in contracting long-term based on spot-market pricing.

CONVERSION

The Conversion Value remained stable throughout 1990. Beginning the year at \$1.50 per pound U as UF₆, it declined slightly to \$1.45 per pound U on March 31, and has remained at that level since. Early in the year, an overabundance of UF₆ relative to concentrates put some downward pressure on conversion prices. But this inequality between the UF₆ Value and the sum of the values of its components—concentrates and conversion—served

only temporarily to make UF₆ a more attractive form of uranium. Buyers seeking conversion services on the secondary market usually concluded transactions at or near the prevailing Conversion Value.

On a few occasions during the year, a conversion sale would be made at a significant discount from NUEXCO's published Conversion Value. In all cases the seller, usually an intermediary, was holding UF₆ but needing U₃O₈. The seller was then forced to entice a discretionary buyer to purchase conversion by taking the seller's UF₆ and returning U₃O₈. In order to accomplish this, a very low price, sometimes below \$1.00 per pound U, would be required. Such transactions were sufficiently rare that they did not influence the secondary conversion market to a significant degree. When a utility issued a request for spot market conversion services, transactions typically occurred at or near prices represented by the NUEXCO Conversion Value.

Sixteen near-term conversion sales have been reported through November 1990. Nearly all of the buyers were utilities, purchasing primarily from intermediaries and converters. Total volume is well over five million pounds U equivalent. About two-thirds of sales involved US market participants; the remaining third had European buyers and sellers. Two intermediate-term conversion sales have also been reported in 1990; two European utilities purchased a total of nearly one million pounds U equivalent for delivery during the period 1990-1992.

Table 2
1990 Long-Term Natural Uranium Contracts

Form	No. of Sales	Total Volume (million lbs equivalent U ₃ O ₈)	Deliveries
Concentrates	27	40.6	1990-2001
UF ₆	7	5.0	1990-1995
Total	34	45.6	

Pricing Terms	No. of contracts
Market Related	17
Base-Price Escalated	10
Fixed Prices	7
Total	34

URANIUM LOANS

Natural uranium loans have emerged as a major source of supply in the market, filling spot demand and thereby deferring purchases until a later date. At least ten million pounds of active loan supply has been available in 1990. The Loan Rate has remained unchanged at 3.5 percent per annum since November 1987.

A total of nearly 14 million pounds equivalent U₃O₈ has been borrowed in 29 different natural uranium loans so far this year. Individual loan quantities have ranged from below 200 thousand pounds to 1.2 million pounds equivalent U₃O₈. Intermediaries have borrowed the majority of the material, although several producers and a few

ANALYSIS AND COMMENTARY

utilities have borrowed uranium as well. Lenders have primarily been utilities (46% by weight) and producers (27% by weight); intermediaries and fabricators made up the balance. US parties make up over two-thirds of the borrowers and just less than two-thirds of the lenders; European parties account for most of the remaining loans.

ENRICHMENT SERVICES AND ENRICHED URANIUM PRODUCT

The SWU Value began the year at \$54 per SWU and dropped to \$50 per SWU on February 28. In essence, the drop was the continuation of a slide in SWU prices that began in late 1989. In the face of several large inventory liquidations, the SWU Value dropped from \$66 per SWU on July 31, 1989 to \$50 by February 28, 1990. Since then, secondary enrichment market price levels have been fairly consistent, despite large month-to-month variations in volume. The SWU Value remained at \$50 until October 31, when it edged upward to \$51 per SWU.

Market activity varied significantly each month. The months of April, August, and October had zero or only one reported enrichment transaction; June and November had numerous sales, in which several million SWU changed hands, including a few long-term sales. Through November, a total of 1.7 million SWU was purchased in 25 near-term SWU and EUP transactions. SWU-only sales (those sales in which the uranium feed component was not also sold) totalled 700 thousand SWU in 13 near-term sales. With only two exceptions, every near-term SWU

sale was made between a utility buyer and an intermediary seller. Twelve near-term EUP sales have been reported this year, accounting for the balance of slightly over one million SWU and almost 7 million pounds equivalent U_3O_8 . SWU buyers and sellers were about equally split between European and US market participants. Additionally, eight long-term SWU-only purchases, all made by utilities, totalled over 4.5 million SWU for deliveries through 2002; one long-term EUP sale to a Far East utility totalled nearly two million SWU and nearly 8 million pounds equivalent U_3O_8 for delivery during the period 1990-1999.

Fundamentally, the SWU market during 1990 was similar to the past several years. Because of the prevalence of requirements-type contracts for enrichment services (particularly the USDOE's Utility Services Contract), only a handful of buyers enter the market each year. In the USA, two or three utilities each looking for 100-150 thousand SWU per reload, and four or five utilities each looking for 20-50 thousand SWU per reload, can be expected to solicit bids. In Europe, where utilities generally have a greater mix of contracts involving Eurodif, Urenco, TENEX, and DOE, demand tends to fluctuate. In an average year, four to six utilities typically will purchase approximately 50 thousand SWU each. The SWU demand situation should continue until about 1994-1996, when the expiration of DOE's Incentive Price II Proposal will cause some utilities to increase spot-market purchasing, unless DOE makes an attractive IP III offer in the meantime. ■

UNITED STATES ENERGY OUTLOOK: NEW CHALLENGES, NEW DIRECTIONS

J. Robert Wolcott, Chairman of NUEXCO's International Advisory Committee, presented the following speech to the British Nuclear Forum's Symposium on Nuclear Power—for Members of the British Parliament, held in London on November 21, 1990.

THE UNITED STATES AND ENERGY

The United States has an energy problem. Electrical capacity has grown only 1% per year, while consumption has grown 4% per year. The United States uses about one quarter of the world's oil production. More than half of the oil consumed each day is imported—about 9 million barrels. Environmental restraints may curtail the use of fossil fuels. About one quarter of the world's nuclear electricity is produced in the United States, but new construction has halted. Unrealistic hopes are being placed on unproven technologies.

The mood of the United States, like other countries, alternates. Complacency prevails during periods of calm; expediency prevails during periods of crisis. The solutions attempted while in either mood produce conflict, for they tend to pit one region against another; one economic class against another; and one ideology against another.

The Need For Electrical Energy

A starting point is electrical power need. There are those who argue that more electrical capacity is unnecessary, and that even less is desirable. On the other hand, history closely links economic progress and electrical growth—a history that cannot be ignored.

During the period of economic prosperity prior to 1970, electrical demand grew at a rate of 7% per year. The growth rate then slowed. In the past few years, the growth rate of electricity demand has been approximately 4% per year. Forecasts for the next decade are for 2.5% to 3% growth per year. Even that modest rate will require 150 to 200 additional large plants, none of which are yet started.

Electrical energy has been replacing other forms of energy. Over the past 15 years, while total energy consumption changed very little, electrical energy consumption increased 50%, and more uses for electricity are certain. Electric-powered automobiles are an example. General Motors recently announced commercial use of such automobiles is expected in a few years. California's recent efforts to reduce air pollution resulted in a mandate that, by 1998, 2% or more of all automobiles sold in the state must be electric-powered.

TWO RECENT CHALLENGES

The electrical industry has changed directions several times in the past, mainly, though not wholly, for economic reasons. Fifty years ago, hydroelectric power was favored. As demand exceeded hydro capability, gas and oil use grew. After oil embargos alarmed the nation in the 1970s, the emphasis shifted to coal and nuclear. Later, opposition to nuclear cast coal in the role of the "fuel of the future." Current circumstances encourage natural gas use, even though its use is not a long-term solution.

Today the electrical industry has two challenges of newly-assumed importance; atmospheric pollution (especially that associated with global warming) and political ideology.

Global Warming

Smog, acid rain, and concerns about ozone depletion are long standing atmospheric problems. However, in recent years, the media has focused on global warming, and therefore public concern has jumped to a new level. Energy production has attracted special attention, as many often claim that three-fourths of all carbon dioxide results from the burning of fossil fuels, and that most global warming is caused by carbon dioxide.

The scientific community is not in agreement as to the causes or effects, or even of the evidence of global warming. Weather analysis is enormously complex, with

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all the weather's interdependent relationships of solar radiation, atmospheric composition, land and sea masses, living organisms, and numerous other global and localized variables.

These interdependencies are not fully understood. Weather models designed to detect global warming require such extensive calculations that the most advanced computers may require a year or more to compute the results. Additionally, the historical data that is available for the weather models may not be accurate enough to determine the minute indicators of global warming.

Partly due to inconclusive results on global warming, views are divided, and often emotionally supported. One line of argument is that, global warming dangers are so great that, despite the uncertainties, drastic action must be taken and without delay. Another line of argument is that, the economic and social costs from drastic actions, especially if misguided, will be so damaging that more reliable scientific evidence is essential before any such drastic and major action is initiated.

Government policy follows the latter—the cautious line. However, the media having declared itself “pro-environment,” portrays global warming as though the worst is certain. Pro-environment programs, with alarmist labels such as *Race to Save the Planet* (a public television series), are becoming commonplace. Whether global warming is as serious as some claim will not be known for decades. What we do know now is that, much of the public's attitude is being influenced as though global warming is real and serious.

Ideology

A couple of decades ago, energy decisions were based on engineering and economics. Under this “old system,” facts were collected, analyzed, and blended with the experienced judgement of knowledgeable professionals. In this way, key decisions were made.

Today, political considerations often reverse the process, so that the most politically desirable end, rather than the most practical end, may be favored. The enthusiasm of the “true believer” often becomes more influential than the knowledge of the professional. Supporting rationales which follow such a selection may be much like the *Alice In Wonderland* sequence: “Verdict first, trial later.”

ENERGY RESOURCES

Fossil Fuels

Energy producing sources have to be examined as a group, and not criticized one by one. Coal, oil, and natural gas provide nearly three quarters of all electrical power generation. Like all fossil fuels, each of these has advantages and disadvantages.

Coal

Fifty-seven percent of electrical generation is fueled by coal; it is economic and reserves are adequate for 300 years. But, coal is the worst of fossil polluters.

Outlook and Opinion — Further restrictive environmental regulations will retard, but not stop, the expanded use of coal. Support for “clean coal” will grow.

Oil

Oil is essential for home heating, petrochemical production, and other uses, but not for electrical power production. Less than 5% is used for electrical power. Oil produces 80% as much carbon dioxide as coal.

Outlook and Opinion — The use of oil to fuel electricity generation will be virtually phased out.

Natural gas

Natural gas is relatively abundant and may be sourced wholly from the United States and Canada. Carbon dioxide emissions are 60% of those of coal and 75% those of oil. However, natural gas is not available in all major consumption centers.

Outlook and Opinion — Natural gas is not a long-term solution—alternates are essential. The greater use of natural gas in the short-term is certain.

Cogeneration

Cogeneration has increased substantially. The most common fuel is natural gas, although automobile tires, wood shaving, walnut shells, refuse, and other exotic fuels may also be used.

Outlook and Opinion — Support from public, industry, and regulatory bodies will increase, but cogeneration, nevertheless, will supply only a small fraction of the national demand.

Conservation

The contribution made by conservation is uncertain, for a common definition of what is considered "conservation" is lacking. For example, is reduced oil demand attributable to its higher cost considered as a credit to conservation? One credible source estimates conservation has contributed the equivalent of a 3% reduction in demand the past decade—equivalent to a couple dozen generating stations.

Virtually all utilities are expanding their conservation programs, as regulators provide utilities with incentives that allow the earning profits for investments made for conservation just like investments made for production facilities.

Outlook and Opinion — Conservation is popular with everyone, and its emphasis will increase. The limits of conservation benefits remain to be determined.

Solar and Other Renewables

Renewables include hydro, solar, wind, geothermal, tidal power, biomass, and other similar energy sources. Proponents often tout that renewables already supply 7% of the world's electrical power. But, hydroelectric is 6% out of that 7%, and three-quarters of the remaining 1% is geothermal, which, in the United States, is largely limited to California. Therefore, all remaining renewables supply a mere quarter of 1%.

The most glamorized and politicized renewable is solar. It would be almost socially unacceptable on many college campuses to question the claims of solar's merits, no matter how preposterous those claims may be. A claim such as "solar development could have eliminated the United States' dependency on Middle East oil," frequently goes unchallenged, even though it is well known that most petroleum is consumed by transportation.

Many solar applications, such as military communications, water heating, and space heating, have found very useful niches. However, central-station application has very different requirements including continuity of service, economics, and large areas of land. Practical application is still far from being feasible.

Government-funded, central-station development has been underway for years at an experimental center in Southern California. Utilities, always eager to adopt

systems that have public support, have shown little inclination to plan for investments in commercial application. Equipment suppliers, usually eager to pursue any opportunity to manufacture and service thousands upon thousands of machines, such as a truly viable solar market would provide, are exiting rather than entering the solar market. Those facts obviously say something about industry's real views of central-station potential.

Outlook and Opinion — Solar's political popularity is such that it is assured of continued federal government funding for research and development, and possibly tax credits. Nevertheless, solar will not contribute significantly to central-station use in the foreseeable future.

Nuclear Power

Nuclear provides 20% of the United States' electrical power. Nuclear does not release pollutants to the atmosphere. Yet, a new nuclear plant has not ordered for 15 years. Even so, plants ordered prior to 1975 have continued to completion, and their startups accounted for more than one third of all new capacity since 1975.

Immense obstacles confront nuclear power's expansion. Many obstacles are regulatory and legal, while many others are traceable to architect-engineer, nuclear vendor, and utility practices. Public ignorance, misunderstanding, and misinformation also contribute.

In short, the situation has been, and remains, a mess. Utilities will not order nuclear plants without changes, which include:

1. Public Pressure

The public is accustomed to dire warnings, while ample power remains available. The attitude is "why not continue as before." A genuine sense of urgency may await more acute shortages.

2. Recognition of Alternatives' Limitations

Many count on the realization of exaggerated claims made for alternative energy sources, such as conservation, solar, and others. A more realistic understanding of what they can contribute is necessary.

3. Reform of the Regulatory Systems

Congress, the Department of Energy, and the Nuclear Regulatory Commission, among others, must promote

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stability and predictability with measures such as one-step licensing and standardization.

4. Recognition of the Real Environmental Choice Between Nuclear and Fossil Wastes

Environmental choices are between *releasing* the enormous volumes of uncontainable fossil waste, or *containing* very small amounts of nuclear waste. To control, or not to control, is the ultimate choice.

5. Practical Adaptation to Siting Limitations

In prior years plants were located with little public resistance. This resulted in over seventy nuclear sites, most of which contain only one or two plants each. Now resistance to all sites, and especially nuclear, is the rule. Far fewer future sites will be available. As each site must be fully utilized, and accommodate a number of plants, the sites will tend to become generation centers.

6. Advancement of Nuclear Power Plant Safety

The public wants more safety, which the industry can provide. The industry needs to proceed promptly with its safer designs.

7. Modernizing Industry Organization

Industry is not presently structured to implement programs required in the future. Standardized designs, integrated systems design, integrated project control, and turnkey offerings require a different organizational approach.

8. Financial Accountability Related To Decision Accountability

Industry will accept financial responsibility for that which it is allowed to control. But given past history, it cannot accept responsibility for decisions beyond its control. Government must protect the industry from the consequences of government actions.

Outlook and Opinion — Nuclear will gradually return. Within a few years, a demonstration plant program will materialize. Commercial ordering may resume in a decade. In the long term, future generations will insist on nuclear power, for it is an inexhaustible, environmentally beneficial energy source. The waste issue, so important today, will disappear when managed competently.

A NATIONAL ENERGY STRATEGY

Two years ago, President Bush directed the Secretary of Energy to prepare a National Energy Strategy by December of this year. Although the outcome is unknown, a program along the following lines is probable:

1. Increase the emphasis on **conservation**.
2. Continued "**clean coal**" research.
3. **Avoidance of coal** where practical.
4. **Phasing out oil** for electricity generation.
5. **Greater reliance on natural gas** in the near-term.
6. Encourage a **nuclear power plant demonstration** program adequate to maintain the nuclear option.
7. Modest increases in **research and development for renewables**: fusion, solar, and others.

I would like to see a more action-oriented program. I am concerned that the United States is working itself into a blind alley much like Sweden, and possibly others, has done.

Sweden, a high per capita user of electrical energy, has evolved a de facto energy policy piece by piece over the past 10 to 15 years. One piece was the prohibition of new hydro; another was the prohibition of increased carbon dioxide emissions; another piece was the mandated shutdown of all twelve nuclear plants (half of Sweden's current electrical supply) by the year 2010; and another was assuming conservation and renewables would compensate for lost nuclear-generated electrical capacity.

Matters have come to a head. With hydro, fossil, and nuclear prohibited; conservation insufficient, and two of Sweden's twelve nuclear plants proposed for shutdown by the mid-1990s, specific problems have to be confronted. What will be the industrial consequences of losing capacity? Who will pay for replacements, etcetera?

A decision was recently reported in which Sweden announced it will continue operation of the two nuclear plants scheduled for shutdown. The de facto policy caved in, at least partially, on the first test.

Some challenges facing Sweden are similar to those of the United States. The United States has a semi-stalemate. Several regions are already short of supply and growing shorter. New capacity requires ten years to develop. The luxury of procrastination is gone.

SUMMARY AND CONCLUSION

Over the past 20 years, study after study of future energy needs has reached the same conclusions. Namely, the United States electrical system will have to rely mainly on coal and nuclear, and natural gas to a lesser extent, for many decades. Conservation will temper demand, but will not avoid more growth in demand. Renewables are years away.

When all the options are looked at together, not individually, as they must be for practical reasons, little has happened that changes those basic conclusions. However

the implementation of practical choices has become more complicated as political influence has broadened. A couple of decades ago, electrical energy supply was a local problem, but acid rain made it a regional problem, and now global warming is making it a world problem.

Energy solutions, moreover, are further complicated by the growth of myths, especially those involving nuclear. Partly for this reason, nuclear progress will be slow for a time. An expansion of the scale that occurred 25 years ago is not expected. But, even though hampered by myths, progress can be seen, for although myths are stubborn things, realities are *even more* stubborn things. ■

NUCLEAR INDUSTRY CALENDAR

1991

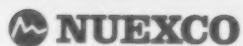
- Jan. 13-16** *Nuclear Insurance Conference* (The Peabody Hotel, Orlando, Florida).
Sponsored by the U.S. Council for Energy Awareness.
Contact: USCEA Conference Office; 202-293-0770; Telex: 7108249602; Fax: 202-785-4113.
- Feb. 3-6** *Nuclear Marketing: Utility Needs in the 1990s* (Clearwater, Florida).
Sponsored by the American Nuclear Society.
Contact: ANS Meetings Department; 708-352-6611.
- Feb. 27-28** *Nuclear Safety: The Way Ahead* (SAS Royal Hotel, Brussels, Belgium).
Co-Sponsored by the Belgian Nuclear Society, the British Nuclear Energy Society, and the Institution of Nuclear Engineers.
Contact: Katie Lye or Louise Coote, IBC Technical Services Ltd; 44-71-236-4080.
- March 24-27** *Fuel Cycle Conference '91* (Sheraton Scottsdale Hotel, Phoenix, Arizona).
Sponsored by the U.S. Council for Energy Awareness.
Contact: USCEA Conference Office; 202-293-0770; Telex: 7108249602; Fax: 202-785-4113.
- April 8-10** *Japan Atomic Industrial Forum Annual Conference* (Tokyo, Japan).
Contact: Japan Atomic Industrial Forum; 3-508-2411; or Fax: 3-508-2094.
- April 14-17** *INFO '91 Conference* (The Westin Hotel, Chicago, Illinois).
Sponsored by the U.S. Council for Energy Awareness.
Contact: USCEA Conference Office; 202-293-0770; Telex: 7108249602; Fax: 202-785-4113.
- April 14-18** *Third International Conference on Nuclear Fuel Reprocessing & Waste Management* (Sendai, Japan).
Sponsored by the Atomic Energy Society of Japan and the Japan Atomic Industrial Forum, and co-sponsored by the American Nuclear Society and the European Nuclear Society.
Contact: Japan Atomic Industrial Forum; 3-508-2411; or Fax: 3-508-2094.
- April 22-25** *JAIF International Conference on Water Chemistry in Nuclear Power Plants* (Fukui, Japan).
Contact: Japan Atomic Industrial Forum; 3-508-2411; or Fax: 3-508-2094.
- May 8-10** *Second International Conference on Transportation for the Nuclear Industry* (Bournemouth, United Kingdom).
Co-Sponsored by the Institution of Nuclear Engineers, the European Nuclear Society, the American Nuclear Society, the Chartered Institute of Transport, and the Institution of Civil Engineers.
Contact: INE Conference Secretary; 081-698-1500 or 081-698-4750; Fax: 018-695-6409.
- May 12-14** *World Nuclear Fuel Market Annual Meeting* (Atlanta, Georgia).
Contact: Donna Cason, World Nuclear Fuel Market; 404-447-1144.
- May 14-16** *Annual Meeting on Nuclear Technology '91* (Hotel & Congress Center Maritim, Bonn, Germany).
Sponsored by the Kerntechnische Gesellschaft e.V. and the Deutsches Atomforum e.V.
Contact: INFORUM GmbH, Congress Office JK '91, Heussallee 10, D-5300 Bonn 1, or 0228/507 223.

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- June 2-6** *American Nuclear Society Annual Meeting*
(Marriot Orlando World Center, Orlando, Florida).
Contact: ANS Meetings Department; 708-352-6611.
- June 23-26** *International Conference on Enrichment* (The Westin Hotel, Washington, DC).
Sponsored by the U.S. Council for Energy Awareness.
Contact: USCEA Conference Office; 202-293-0770; Telex: 7108249602; Fax: 202-785-4113.
- Sept. 4-6** *Uranium Institute Sixteenth Annual Symposium* (London, UK).
Contact: Uranium Institute; 44-71-225-0303; or Fax: 44-71-225-0308.
- Sept. 22-25** *International Uranium Seminar '91* (The Don Cesar Hotel, St. Petersburg/Tampa, Florida).
Sponsored by the U.S. Council for Energy Awareness.
Contact: USCEA Conference Office; 202-293-0770; Telex: 7108249602; Fax: 202-785-4113.
- Sept. 29-
Oct. 2** *American Mining Congress Mining Convention* (Salt Lake City, Utah).
Contact AMC Convention Office; 202-861-2800; or Fax: 202-861-7535.
- Nov. 10-13** *Nuclear Energy Forum* (Westin St. Francis Hotel, San Francisco, California).
Sponsored by the U.S. Council for Energy Awareness.
Contact: USCEA Conference Office; 202-293-0770; Telex: 7108249602; Fax: 202-785-4113.
- Nov. 10-15** *American Nuclear Society Winter Meeting* (Hilton Hotel, San Francisco, California).
Contact: ANS Meetings Department; 708-352-6611.

1992

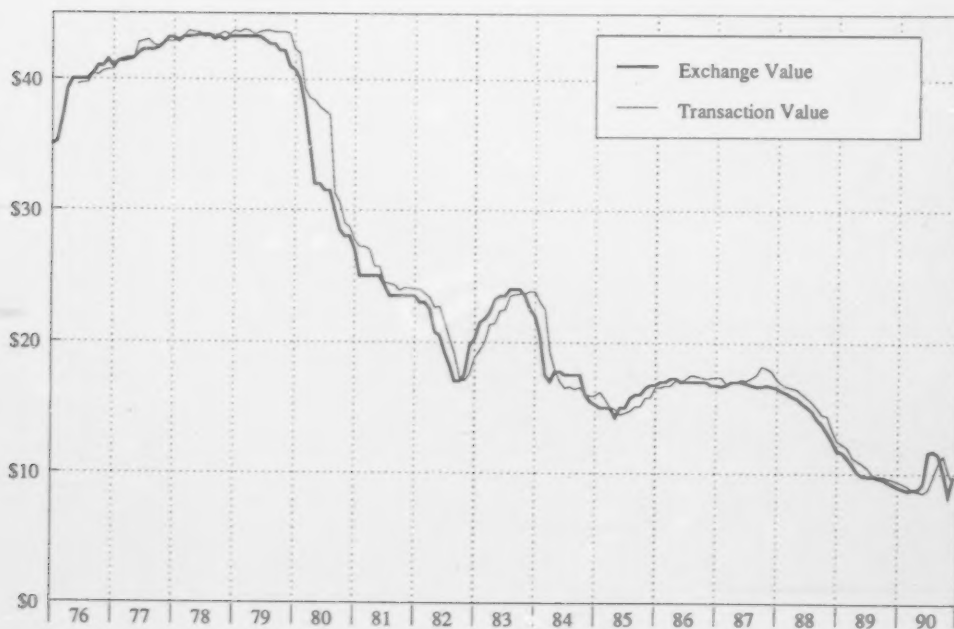
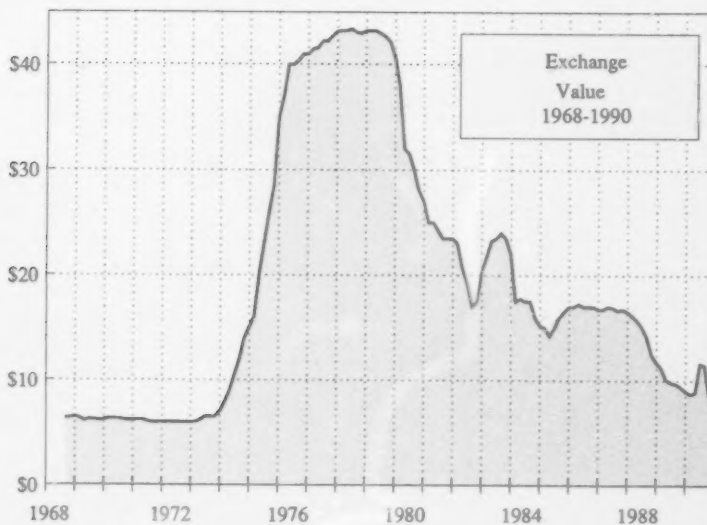
- April 12-16** *8th Pacific Basin Conference* (Taipei, Taiwan).
Sponsored by the American Nuclear Society.
Contact: ANS Meetings Department; 708-352-6611.
- Sept. 21-23** *Second International Conference on Training for Operation & Maintenance in the Nuclear Industry*
(The Moat House International Hotel, Stratford-upon-Avon, United Kingdom).
Sponsored by the Institution of Nuclear Engineers.
Contact: INE Conference Secretary; 081-698-1500 or 081-698-4750; Fax: 018-695-6409.



HISTORICAL MARKET DATA

NUEXCO Historical Exchange Value and Transaction Value

(In US Dollars per Pound Equivalent U3O8)



HISTORICAL MARKET DATA

HISTORICAL MARKET VALUES

EXCHANGE VALUES

Determined as of the last day of the month indicated (\$US/lb U₃O₈)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1968	—	—	—	—	—	—	—	6.35	6.35	6.40	6.45	6.50
1969	—	6.35	6.10	6.10	6.25	6.25	6.20	6.20	6.15	6.15	6.15	6.20
1970	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.20	6.15	6.15	6.15	6.15
1971	6.20	6.20	6.20	6.20	6.15	6.05	6.00	5.95	5.95	5.95	5.95	5.95
1972	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95
1973	5.95	6.00	6.10	6.20	6.45	6.50	6.50	6.50	6.50	6.50	6.75	7.00
1974	7.70	7.90	8.00	9.00	9.50	10.50	11.50	12.00	12.50	14.00	14.75	15.00
1975	16.00	16.00	18.00	20.00	21.00	23.00	24.70	26.00	26.00	28.50	30.00	35.00
1976	35.20	37.00	39.25	40.00	40.00	40.00	40.00	40.40	41.00	41.00	41.50	41.00
1977	41.35	41.50	41.60	41.60	42.00	42.25	42.25	42.25	42.40	42.75	43.20	43.20
1978	42.90	43.25	43.25	43.25	43.40	43.40	43.40	43.10	43.25	43.00	43.25	43.25
1979	43.25	43.25	43.25	43.25	43.25	43.00	42.70	42.70	42.20	42.20	41.00	40.75
1980	40.00	38.00	35.00	32.00	32.00	31.50	31.50	30.00	28.50	28.00	28.00	27.00
1981	25.00	25.00	25.00	25.00	25.00	24.25	23.50	23.50	23.50	23.50	23.50	23.50
1982	23.00	23.00	22.50	20.75	20.50	19.25	18.25	17.00	17.00	17.50	19.75	20.25
1983	21.50	21.75	22.25	23.25	23.50	23.50	24.00	24.00	24.00	23.50	22.50	22.00
1984	20.50	17.50	17.00	17.75	17.75	17.50	17.50	17.50	17.50	16.00	15.50	15.25
1985	15.00	15.00	15.00	14.25	15.00	15.00	15.75	16.00	16.00	16.50	16.75	17.00
1986	17.00	17.00	17.25	17.25	17.00	17.00	17.00	17.00	17.00	17.00	16.75	16.75
1987	16.65	16.75	17.00	17.00	17.00	16.90	16.75	16.65	16.65	16.75	16.65	16.55
1988	16.30	16.15	15.90	15.75	15.40	15.10	14.75	14.15	13.75	13.15	12.50	11.75
1989	11.60	11.20	10.70	10.10	9.85	9.80	9.80	9.70	9.60	9.40	9.20	9.00
1990	8.85	8.70	8.80	8.80	9.25	11.60	11.70	11.45	10.10	8.35	9.80	

US PREMIUM (Relative to the Exchange Value)

Determined as of the last day of the month indicated (\$US/lb U₃O₈)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1986	—	—	—	—	—	—	—	—	—	—	0.65	0.75
1987	0.85	1.00	1.50	1.50	0.90	0.60	2.50	2.35	2.10	1.65	0.85	0.65
1988	0.70	0.50	0.15	0.25	0.60	0.00	0.00	0.00	0.00	0.00	Discontinued	



HISTORICAL MARKET DATA

UF₆ VALUES

Determined as of the last day of the month indicated (\$US/kg U as UF₆)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1985	—	—	—	40.50	42.50	42.50	44.00	44.50	44.50	46.00	46.00	47.00
1986	47.00	48.00	48.00	48.50	48.25	48.25	48.25	48.00	48.00	48.00	48.00	47.75
1987	47.75	48.00	48.00	48.00	47.75	47.75	47.50	47.00	46.75	47.00	47.00	47.00
1988	46.50	46.00	45.50	45.25	44.75	44.00	42.75	41.00	40.75	39.00	37.50	35.50
1989	34.75	34.00	33.00	30.50	30.25	30.25	30.00	29.75	29.75	28.25	27.75	26.50
1990	25.90	25.25	24.40	24.40	25.50	32.00	32.50	32.25	29.50	24.75	28.75	

US UF₆ PREMIUM (Relative to the UF₆ Value)

Determined as of the last day of the month indicated (\$US/kg U as UF₆)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1986	—	—	—	—	—	—	—	—	—	—	2.50	2.50
1987	2.50	2.50	3.50	3.00	2.25	1.75	6.50	6.00	4.25	3.10	2.25	2.00
1988	1.25	1.25	0.50	0.50	1.00	0.00	0.00	0.00	0.00	0.00	Discontinued	

TRANSACTION VALUES

Determined as of the last day of the month indicated (\$US/lb U₃O₈)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1976	—	—	—	—	39.60	39.70	39.70	40.40	40.30	40.60	40.70	40.70
1977	41.30	41.30	41.40	41.50	42.80	42.90	43.00	42.60	42.50	42.80	42.90	42.90
1978	43.10	43.30	43.70	43.60	43.60	43.20	43.30	43.40	43.40	43.60	43.40	43.70
1979	43.60	43.80	43.70	43.40	43.60	43.70	43.70	43.60	43.60	43.60	43.50	42.30
1980	42.00	39.30	38.60	38.40	37.90	37.60	37.30	31.60	30.60	29.00	28.70	27.70
1981	27.20	27.20	27.00	25.70	25.70	24.50	24.40	24.30	23.90	24.10	24.10	24.00
1982	24.00	23.70	23.40	22.60	22.70	21.50	20.30	19.10	17.30	17.00	17.55	18.80
1983	19.35	20.00	21.35	21.40	22.35	22.45	23.50	23.60	23.65	23.65	23.85	23.85
1984	23.05	22.50	19.25	17.90	17.00	16.50	16.60	16.40	16.55	16.05	15.90	15.90
1985	16.20	15.70	15.05	14.90	14.45	14.60	14.75	15.10	15.10	15.75	15.80	16.55
1986	16.55	16.70	16.70	17.10	17.15	17.20	17.50	17.45	17.35	17.25	17.30	17.35
1987	17.35	16.90	16.95	17.00	17.20	17.10	17.30	17.55	18.20	18.05	17.80	17.20
1988	16.85	16.65	16.55	16.45	16.10	15.80	15.45	15.00	14.50	14.40	13.30	12.50
1989	12.25	12.00	11.25	11.00	10.75	10.45	9.95	9.80	9.80	9.65	9.55	9.40
1990	9.25	9.05	8.75	8.65	8.55	8.80	9.75	10.80	11.40	10.10	9.30	

HISTORICAL MARKET DATA
LOAN RATES

Determined as of the last day of the month indicated (Percent per Annum)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1968	—	—	—	—	—	—	—	4.00	4.00	4.00	4.00	4.00
1969	4.00	4.00	5.00	5.00	5.00	5.00	5.00	5.00	6.00	6.00	6.00	6.00
1970	6.00	6.20	6.40	6.50	6.50	6.50	6.50	5.00	6.50	6.00	5.50	5.50
1971	5.00	4.75	4.75	4.75	5.00	5.25	5.25	5.25	5.25	5.25	4.50	4.50
1972	4.00	4.00	4.00	4.50	4.50	4.50	5.00	5.00	5.00	5.00	5.00	5.00
1973	5.50	5.50	5.75	5.75	6.00	6.25	7.00	7.00	7.00	7.00	7.50	8.00
1974	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
1975	8.00	7.00	7.00	7.00	7.00	6.50	6.50	6.50	6.50	6.50	6.50	6.50
1976	6.50	6.50	6.50	6.50	*	*	*	*	*	*	*	*
1977	*	*	*	*	6.50	6.50	6.50	6.75	7.25	7.25	7.25	7.25
1978	7.25	7.00	7.00	7.00	7.00	7.50	7.75	7.75	7.75	7.00	7.00	7.00
1979	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
1980	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
1981	7.00	7.30	7.00	7.00	7.00	5.50	5.50	5.50	5.50	6.00	6.00	6.00
1982	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
1983	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
1984	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
1985	6.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
1986	5.00	5.00	5.00	5.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
1987	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	4.00	4.00	3.50	3.50
1988	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1989	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1990	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50

* Float with Prime Rate

CONVERSION VALUES

Determined as of the last day of the month indicated (\$US/lb U as UF6)

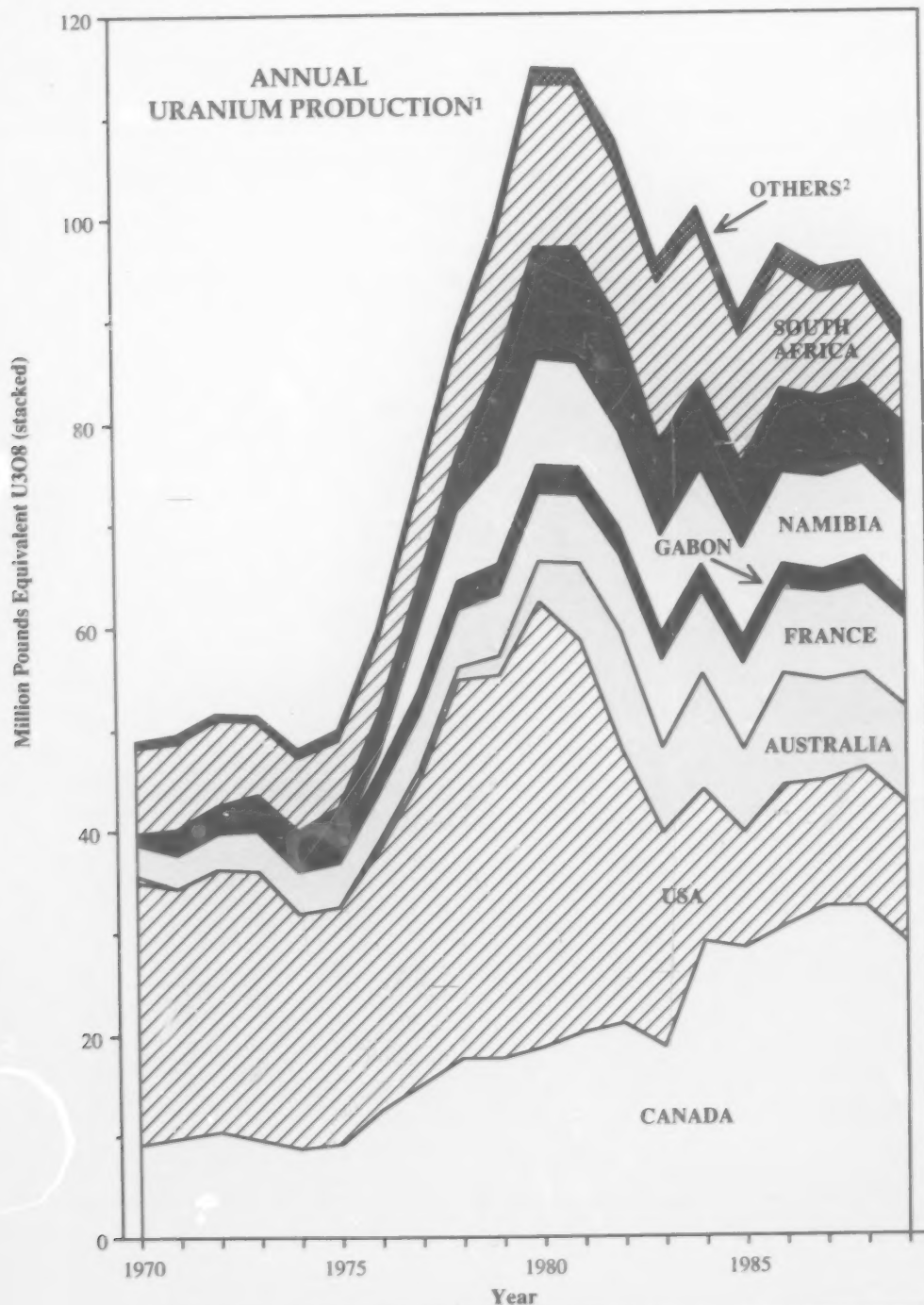
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1981	1.20	1.20	1.20	1.40	1.15	1.15	1.15	1.10	1.10	1.10	1.20	1.20
1982	1.20	1.20	1.20	1.20	1.00	1.00	1.00	0.90	1.10	1.60	1.45	1.45
1983	1.20	1.40	1.40	1.20	1.20	1.20	1.10	1.10	1.00	0.60	0.60	0.60
1984	0.60	0.30	0.80	0.80	0.80	0.00	0.00	0.80	1.00	1.00	0.80	0.80
1985	1.00	1.00	1.00	1.50	1.50	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1986	1.60	1.80	1.90	1.80	1.80	1.80	1.80	1.90	1.90	1.90	1.80	1.80
1987	1.80	1.80	1.80	1.80	1.80	1.80	1.90	1.90	1.90	1.90	1.90	1.90
1988	1.90	1.80	1.80	1.80	1.80	1.80	1.85	1.95	1.95	1.95	1.95	1.95
1989	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.90	1.90	1.80	1.75	1.65
1990	1.50	1.50	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45

SWU VALUES

Determined as of the last day of the month indicated (\$US per SWU)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1986	80	80	80	80	75	78	78	78	78	78	80	80
1987	80	80	77	77	75	73	75	75	73	69	73	73
1988	73	73	70	68	68	68	68	65	65	65	65	65
1989	65	67	67	67	66	66	66	65	63	59	57	54
1990	54	50	50	50	50	50	50	50	50	51	51	51

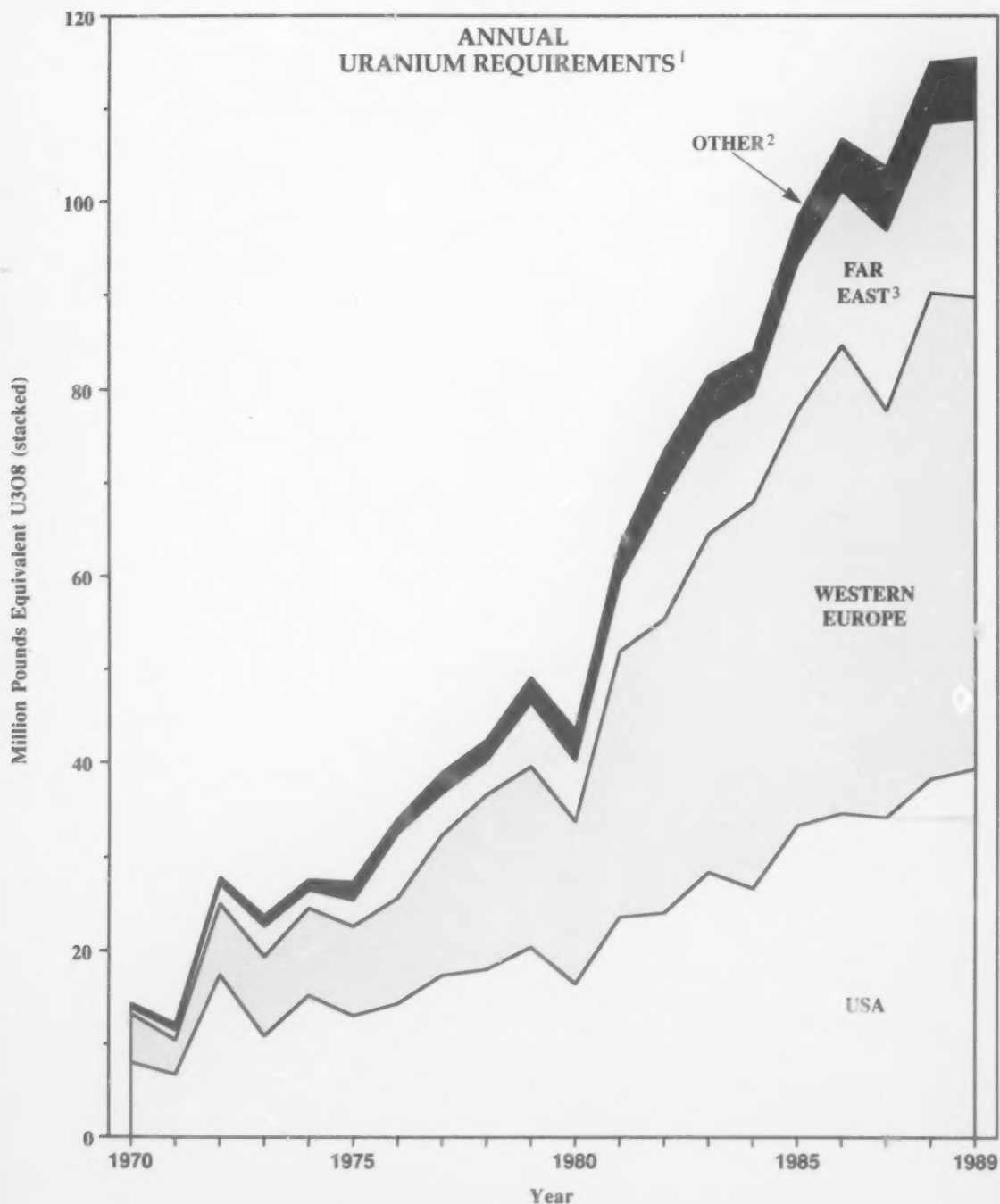
HISTORICAL MARKET DATA



¹ Estimated world production in 1989 totalled 89.6 million pounds (Australia—9.5; Canada—28.7; France—8.5; Gabon—2.2; Namibia—9.2; Niger—7.7; South Africa—7.7; USA—13.7; Others²—2.3).

² Others includes: Argentina, Belgium, Brazil, India, Pakistan, Portugal, Spain, West Germany and Yugoslavia

HISTORICAL MARKET DATA



¹ Calculated by NUEXCO based on actual completion dates and operating performance, and NUEXCO's estimate of enriching tails assays.

² Other include: Argentina, Brazil, Canada, India, Mexico, Pakistan and South Africa.

³ Does not include Peoples Republic of China.

GOVERNMENT STATISTICS

AUSTRALIA					
Year	Period ¹	Consumer Price Index ² (1980/1981 = 100)	Price Index of Materials Used in Manufacturing Industry — All Groups ³ (1984/1985 = 100)	Average Weekly Ordinary Time Earnings — Adult Males — Australia ⁴ (Australian dollars)	Award Rates of Pay Indexes Australia - Adult Males In Mining Wage Earners, Weekly Rates ⁵ (June 1985=100)
1980	Avg.	95.8	83.1	—	140.8 ⁶
1981	Avg.	105.0	85.9	—	154.1 ⁶
1982	Avg.	116.7	89.0	—	174.9 ⁶
1983	Avg.	128.5	96.9	—	181.9 ⁶
1984	Avg.	133.6	98.0	—	194.4 ⁶
1985	Avg.	142.6	107.3	—	103.7
1986	Avg.	155.5	101.5	—	106.1
1987	Avg.	168.7	108.9	465.88	112.3
1988	Avg.	180.9	111.8	496.90	115.2
1989	Avg.	194.6	117.0	534.65	126.0
Jan	1990	—	119.2	—	128.1 R
Feb	1990	—	120.8	—	128.1 R
Mar	1990	204.1	121.5	—	128.3 R
Apr	1990	—	119.9	—	128.5
May	1990	—	118.9	—	128.8 R
June	1990	207.4	116.6	—	129.2
July	1990	—	116.4	—	129.4
Aug	1990	—	122.4	—	129.4
Sept	1990	208.9	—	—	129.6

P = Preliminary R = Revised since last month

¹ Monthly data for the period 1967 to 1986 appears in Report 233 (January 1988).

² Weighted average of six State capital cities (1975 to 1980), and eight capital cities from 1981 (Base: Financial year July 1980 to June 1981 = 100.0). Figures shown at end of quarter represent quarterly average.

³ Australian Bureau of Statistics, Canberra: "Price Index of Materials Used in Manufacturing Industry" (Catalogue No. 6411.0).

⁴ Australian Bureau of Statistics, Canberra: "Award Rates of Pay Indexes, Australia" (Catalogue No. 6312.0). Figures for the latest fourteen months shown are subject to revision.

⁵ Australian Bureau of Statistics, Canberra: "Average Weekly Earnings, States & Australia" (Catalogue No. 6302.0).

⁶ Base: June 1976 = 100.

GOVERNMENT STATISTICS

CANADA								
Wage-earner Data: Average Hourly Earnings (C\$) ⁴								
Industrial Products Price Index: All Commodities ¹ (1986 = 100) ²		Consumer Price Index: All Items (1986 = 100) ³	Uranium Mines (SIC 057)	Metal Mines (SIC 051-059)	Mines, Quarries and Oil Wells (SIC 051-099)	Metal Rolling, Casting and Extruding (SIC 298)	Chemicals and Chemical Products Industries (SIC 372-379)	
1980	Avg.	75.7	67.1	—	—	—	—	—
1981	Avg.	83.4	75.5	—	—	—	—	—
1982	Avg.	89.0	83.7	—	—	—	—	—
1983	Avg.	92.1	88.5	17.22	—	14.18	10.67	11.10
1984	Avg.	96.3	92.3	17.89	—	14.97	11.11	11.68
1985	Avg.	99.0	96.0	18.53	16.48	15.56	11.85	12.12
1986	Avg.	100.0	100.0	19.38	16.70	15.76	12.28	12.58
1987	Avg.	102.4	104.4	20.12	17.15	16.11	12.58	13.20
1988	Avg.	106.9	108.6	20.91	18.51	16.95	13.17	13.77
1989	Avg.	109.4	114.0	21.97	20.02	18.41	13.71	14.16
Jan	1990	108.7	116.9	21.88	20.39	19.03	13.99	14.78
Feb	1990	109.3	117.6	22.51	20.63	19.14	14.49	15.03
Mar	1990	109.2	118.0	22.52	20.75	19.17	14.99	15.07
Apr	1990	109.1	118.1	23.17	21.20	19.46	14.83	14.93
May	1990	109.5	118.7	23.28	20.55	19.01	14.71	15.06
June	1990	109.4	119.2	21.85	20.63	18.96	14.69	15.05
July	1990	109.1	119.8	20.92	20.18	18.66	14.34	15.20
Aug	1990	109.2	119.8	23.88 R	20.51 R	18.59 R	14.50 R	15.33 R
Sept	1990	109.9	120.2	24.89 P	20.95 P	18.92 P	14.26 P	15.57 P
Oct	1990	110.3	121.2	—	—	—	—	—

P = Preliminary **R** = Revised since last month

¹ Statistics Canada, Prices Division, Ottawa: "Industry Price Indexes" (Catalogue 62-011). Indexes for the most recent six months shown are subject to revision. This category was formerly known as "Manufacturing." Monthly data for the period 1967 to 1986 is found in Report 233.

² New Base Year of 1986 as of Report 266. Previous Base Year was 1981. All figures in column recalculated by 0.791 multiplier.

³ New Base Year of 1986 as of Report 264. Previous Base Year was 1981. All figures in column recalculated by 0.755 multiplier.

⁴ Statistics Canada, Labour Division, Employment and Payrolls Section, Ottawa: "Employment, Earnings and Hours." Monthly data for the period 1983 to 1986 is found in Report 233.

GOVERNMENT STATISTICS

SOUTH AFRICA

		Average Declared Working Costs per Metric Ton of Gold Ore Milled ¹ (Rand)	Tonnage-Weighted Index of Average Working Costs per Metric Ton of Gold Ore Milled ² (March 1982 = 100)	Consumer Price Index ³ (1985 = 100)	Production Price Index All Groups ⁴ (1985 = 100)	Total Employment in Mining and Quarrying ⁵	Total Salaries and Wages in Mining and Quarrying ⁵ (1,000 Rand)
							Annual Total ⁶
1980	Avg.	35.53	—	51.9	55.2	709,042	2,237,689
1981	Avg.	41.89	—	59.8	62.7	722,918	2,756,928
1982	Avg.	47.25	104.2	68.6	71.4	702,041	3,181,584
1983	Avg.	51.88	115.0	77.1	79.0	700,901	3,563,282
1984	Avg.	58.95	130.3	86.0	85.6	711,511	4,134,390
1985	Avg.	68.76	151.6	100.0	100.0	724,587	4,778,612
1986	Avg.	80.22	177.9	118.6	119.5	756,637	5,767,950
1987	Avg.	95.01	223.1	137.7	136.2	751,864	6,911,395
1988	Avg.	106.69	241.1	155.4	154.1	705,355	7,774,054
1989	Avg.	116.65	273.0	178.2	177.5	700,360	8,833,934
							Monthly Total
Jan	1990	—	—	192.0	188.8	688,837	801,616
Feb	1990	—	—	193.3	190.3	674,026	767,274
Mar	1990	126.74	296.3	196.4	190.9	704,660	780,614
Apr	1990	—	—	198.3	194.1	696,107	810,474
May	1990	—	—	200.4	196.3	613,527	719,191
June	1990	128.25	299.87	201.8	197.0	676,621	841,165
July	1990	—	—	203.2	197.2	682,001	903,195
Aug	1990	—	—	206.5	199.8	—	—
Sept	1990	129.46	312.55	209.7	203.2	—	—
Oct	1990	—	—	211.1	—	—	—

P = Preliminary R = Revised since last month

¹Chamber of Mines of South Africa, Johannesburg: "Analysis of Working Results," published quarterly. Historical Data by month appears in Report 236.

²Page 16 of Report 178 contains description and calculation of index, and page 24 of Report 178 lists figures for 1982.

³Central Statistical Service, Pretoria: All income groups-weighted average. Historical Data by month appears in Report 236.

⁴Central Statistical Service, Pretoria: All commodities for consumption in South Africa.

⁵Central Statistical Service, Pretoria: Historical Data by month appears in Report 236.

⁶Annual total is shown, rather than monthly average for indicated year.

GOVERNMENT STATISTICS
UNITED STATES

		Producer Price Index ¹		Consumer Price Index ² (1982-1984 = 100)	GNP Implicit Price Deflator ³ (1982 = 100)	Gross Average Hourly Earnings of Production or Non-supervisory Workers (US\$) ⁴			
		Industrial Commodities (1982 = 100)	All Commodities (1982 = 100)			Metal Mining (SIC 10)	Primary Non-ferrous Metals (SIC 333)	Chemicals and Allied Products (SIC 28)	Electric and Electronic Equipment (SIC 36)
1980	Avg.	88.0	89.8	82.4	85.7	10.26	10.63	8.30	6.94
1981	Avg.	97.4	98.0	90.9	94.0	11.55	11.98	9.12	7.62
1982	Avg.	100.0	100.0	96.5	100.0	12.31	12.93	9.96	8.21
1983	Avg.	101.1	101.3	99.6	103.9	12.58	13.43	10.58	8.67
1984	Avg.	103.3	103.7	103.9	107.7	13.05	13.43	11.07	9.04
1985	Avg.	103.7	103.2	107.6	110.9	13.38	13.74	11.56	9.46
1986	Avg.	100.0	100.2	109.6	113.9	12.46	13.48	11.98	9.65
1987	Avg.	102.6	102.8	113.6	117.7	12.52	12.98	12.37	9.88
1988	Avg.	106.3	106.9	118.3	121.7	13.24	13.26	12.71	9.79
1989	Avg.	111.6	112.2	124.0	126.6	13.59	13.72	13.09	10.05
Jan	1990	114.1	114.9	127.4	—	13.69	13.95	13.34	10.13
Feb	1990	113.6	114.4	128.0	—	13.70	13.99	13.27	10.16
Mar	1990	113.2	114.2	128.7	129.7	13.80	14.04	13.34	10.17
Apr	1990	113.2	114.1	128.9	—	13.92	14.30	13.53	10.17
May	1990	113.5	114.6	129.2	—	13.96	14.16	13.46	10.22
June	1990	113.2 R	114.3 R	129.9	130.9	14.00	14.31	13.51	10.27
July	1990	113.2	114.3	130.4	—	14.29	14.49	13.58	10.34
Aug	1990	115.9	116.5	131.6	—	14.27 R	14.60	13.57 R	10.33 R
Sept	1990	118.3	118.3	132.7	132.1	14.41 P	14.51 P	13.63 P	10.43 P
Oct	1990	121.3	120.8	133.5\	—	—	—	13.76 P	10.45 P

P = Preliminary **R** = Revised since last month

¹US Bureau of Labor Statistics, Washington, D.C.: "Producer Prices and Price Indexes," (formerly "Wholesale Prices and Price Indexes"). Producer Price Indexes are revised four months after they are first released to reflect the availability of late reports and corrections by respondents. Historical data is presented in Report 233.

²US Bureau of Labor Statistics, Washington, D.C.: Consumer Price Index for All Urban Consumers, US City Average, All Items. Historical data is presented in Report 233.

³US Department of Commerce, Washington, D.C.: Bureau of Economic Analysis, National Income and Wealth Division: "Survey of Current Business." The GNP Implicit Price Deflator is published quarterly, and seasonally adjusted. Historical data is presented in Report 233.

⁴US Bureau of Labor Statistics, Washington, D.C.: "Employment and Earnings." All data based on 1972 revision of SIC Manual. Historical data is presented in Report 233.

GOVERNMENT STATISTICS

**VOLUME AND PRICE OF URANIUM DELIVERIES
TO THE EUROPEAN COMMUNITY¹**
(Compiled from data published by the Euratom Supply Agency)

Year	Volume of Deliveries to the EC ² (MTU)	Percentage of Deliveries Made Under Spot Contracts	Medium or Long-Term Contracts ³ Average Price		Spot Contracts ³ Average Price	
			in ECU per pound U ₃ O ₈	in US Dollars per pound U ₃ O ₈	in ECU per pound U ₃ O ₈	in US Dollars per pound U ₃ O ₈
1977	n/a	n/a	n/a	n/a	n/a	\$41.00
1978	n/a	n/a	n/a	n/a	n/a	\$43.00
1979	10,000	n/a	n/a	n/a	n/a	\$44.50
1980	8,600	n/a	n/a	\$36.00	n/a	\$35.00
1981	13,000	less than 10	n/a	\$33.25	n/a	\$28.00
1982	12,500	less than 10	ECU 32.25	\$32.00	ECU 24.25	\$24.00
1983	13,500	less than 10	ECU 34.75	\$31.00	ECU 26.00	\$23.25
1984	11,000	less than 10	ECU 37.75	\$29.75	ECU 24.50	\$19.25
1985	11,000	11.5	ECU 38.00	\$29.00	ECU 19.50	\$15.00
1986	12,000	9.5	ECU 31.50	\$31.00	ECU 18.00	\$17.75
1987	14,000	17.0	ECU 28.25	\$32.50	ECU 15.00	\$17.25
1988	12,500	4.5	ECU 26.92	\$31.82	ECU 13.65	\$16.13
1989	13,500	11.5	ECU 26.63	\$29.35	ECU 11.04	\$12.19

R = Revised

¹ The twelve European Community member nations are Belgium, Denmark, France, West Germany, Greece, Ireland, Italy, Luxembourg, The Netherlands, Portugal, Spain, and the United Kingdom; prior to January 1986, Spain and Portugal were not members of the EEC.

² The only deliveries taken into account are those made to final users, namely the electric utilities or their procurement organizations; deliveries to middlemen or fuel cycle companies are not included. The sales between utilities in the Community are also excluded. The quantities covered are those which were entered into accounting records during the year stated.

³ For deliveries made under medium or long-term contracts (i.e., for which the time between the date of signature and the date of the last delivery exceeds one year) the prices were expressed in seven different currencies. In order to calculate an average price, these prices have been converted into European Currency Units (ECU) and US dollars. The average prices were weighted by quantity and converted on the basis of the average annual exchange rate of the different currencies against the ECU and US dollar. Exchange rates are published by European Communities Statistical Office and the International Monetary Fund.

GOVERNMENT STATISTICS

US URANIUM MARKETING ACTIVITIES STATISTICS
(Compiled from data published by the US Energy Information Administration) ¹

Year	Total Production (million pounds U ₃ O ₈)	Deliveries to Domestic Utilities From US Suppliers ² (million pounds U ₃ O ₈)	Average Price of Delivered Uranium ² (\$/lb. U ₃ O ₈)	Quantity of Uranium Imported ³ (million pounds U ₃ O ₈)	Average Price of Imported Uranium (\$/lb. U ₃ O ₈)	Quantity of Uranium Exported (million pounds U ₃ O ₈)
1976	25.5	27.6	\$16.10	3.6	n/a	1.2
1977	29.9	27.8	\$19.75	5.6	n/a	4.0
1978	37.0	31.6	\$21.60	5.2	n/a	6.8
1979	37.5	33.0	\$23.85	3.0	n/a	6.2
1980	43.7	35.0	\$28.15	3.6	\$43.10	5.8
1981	38.5	32.6	\$34.65	6.6	\$32.90	4.4
1982	26.9	23.5	\$38.37	17.1	\$25.19	6.2
1983	21.2	24.2	\$38.21	8.2	\$26.16	3.3
1984	14.9	22.5	\$32.65	12.5	\$21.86	2.2
1985	11.3	21.7	\$31.43	11.7	\$20.08	5.3
1986	13.5	18.9	\$30.01	13.5	\$20.07	1.6
1987	13.0	20.8	\$27.37	14.8	\$19.14	1.0
1988	13.1	17.6	\$25.65	15.8	\$19.03	3.3

¹ Sources: 1976-1983: US Department of Energy/Energy Information Administration, *Survey of United States Marketing Activity*
1984-1988: Energy Information Administration, *Uranium Industry Annual*

² Data for 1976-1981 includes both domestic utilities and agents

³ Includes imports by domestic utilities and domestic suppliers

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